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Jno. M. Dalrymple

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THE DOMESTIC ENCYCLOPÆDIA;

OR,

A DICTIONARY OF FACTS,

AND USEFUL KNOWLEDGE.

COMPREHENDING

A CONCISE VIEW OF THE LATEST DISCOVERIES, INVENTIONS, AND IMPROVEMENTS,

CHIEFLY APPLICABLE TO RURAL AND DOMESTIC ECONOMY.

TOGETHER WITH

DESCRIPTIONS OF THE MOST INTERESTING OBJECTS OF NATURE AND ART; THE HISTORY OF MEN AND ANIMALS, IN A STATE OF HEALTH OR DISEASE; AND PRACTICAL HINTS RESPECTING THE ARTS AND MANUFACTURES, BOTH FAMILIAR AND COMMERCIAL.

ILLUSTRATED WITH NUMEROUS ENGRAVINGS AND CUTS.

IN FIVE VOLUMES.

VOLUME II.

BY A. F. M. WILLICH, M. D.

AUTHOR OF THE LECTURES ON DIET AND REGIMEN, &c. &c.

FIRST AMERICAN EDITION; WITH ADDITIONS,

APPLICABLE TO THE PRESENT SITUATION OF THE UNITED STATES:

BY JAMES MEASE, M. D.

AND FELLOW OF THE AMERICAN PHILOSOPHICAL SOCIETY.

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ERRATA.

Page 107, column 2, line 11 from bottom, *for* Virginia, *read* Virginiana.
—— 108, column 1, lines 4 and 5, dele the [ ]
—— 143, column 2, line 11 from bottom, in some copies, *after* Soc. *read* by Mr. L' Hommedieu.
—— —— column 2, line 12 from bottom, in some copies *dele* by Mr. L'Hommedieu.
—— 181, line 14, between the words " and stand" *insert* " let it."

THE

DOMESTIC ENCYCLOPÆDIA.

CARP, or *Carpio*, L. is a species of the *Cyprinus*, a genus of fish comprising above thirty species. Carp are also called white-fish, on account of their glittering scales, and are distinguished from other fish, by having no teeth, the want of which is supplied by several small rough bones fixed in their throat. They were introduced into England during the 16th century.

These fish are much celebrated for their longevity, many of them attaining an age of from 60 to 100 years, and growing to the extraordinary length of six feet. They delight in muddy ponds, which are well sheltered from the wind, and into which should be thrown the liquor from cattle-yards,mixed with clay, peas, beans, oil-cake, &c. In order to fatten them, and increase their size, the growth of grass under the water should be particularly attended to; as they principally feed on it during the summer months. To effect this, when the water decreases in summer, the dry naked sides of the pond should be raked, and grass-seeds abundantly sown: these will produce a plentiful supply of herbage, which, when the pond is filled up by rains, affords a feeding place, where the fish will speedily fatten. In the winter, they crowd together in the mire under the ice, which should be occasionally opened to admit air, for want of which the carp is often severely affected.....But where it is practicable, part of the water should be drawn off, which will be more beneficial to the fish, than to penetrate the ice. This should also be done, when the pond has been struck by lightning, or when the fish are sick, which sometimes happens, if the water become foul or turbid.

Carp are much celebrated for their docility, and have been known to be so tame, as to swim to the shore, and take their food, on being called, or summoned by the sound of a bell. In general, however, they are extremely cunning, and difficult to be caught, except during the time of spawning...... The best season for catching carp and barbel, is the month of July,

and the most proper time, at day-break. Care must be taken to use neither lead nor shot in the lines; which ought to be proportionate to the length of the rods, and made of Indian twist, or strong pearl-coloured silk, armed at the bottom links with sea-grass, Turkey-grass, or strong silk-worm gut, perfectly free from knots or frettings.

When the spot for angling is fixed upon, it is requisite, on the preceding night, to throw in a considerable quantity of paste, prepared of bread and bran, or mixed with lob-worms cut to pieces. This purpose may also be effected by throwing in a mixture of blood and grains, which must be repeated three successive nights; the spot being marked with particular attention. In the dawn of the morning, after the depth has been plumbed with the greatest exactness, the bait for the first rod, which is to lie at the bottom, should be a well-scoured lob-worm, and the hook must be passed through its body, about three inches from the tail; that part being more agreeable to the fish than the head. An additional ground-bait should be thrown in, at the same place, on the three preceding nights. The worm being dropped as exactly as possible on the ground-bait just thrown in, the first rod is to be laid on the ground, and the second baited. The bait for this rod must be four red worms, properly cleansed and pierced through the head. The third rod ought to be baited with a paste prepared of the following materials: the crumb of white bread one day old, soaked in warm milk, till it has imbibed enough to make it of the necessary consistence; when the milk is to be pressed out, and a sufficient quantity of honey added, to impart to it a sweet flavour. A little saffron, well dried and powdered, must also be mixed, together with a few drops of oil of rhodium, in order to tinge it of an orange colour. It is then fit for immediate use; but care must be taken, that the floats for each rod be of the short single-plugged kind, and that the fish "be played deep;" as, if this caution be neglected, the fish will "break," and make its escape.

Carp are much esteemed for their delicacy and flavour, which may be greatly improved by keeping them in river water for a few days before they are eaten. Their gall is in much repute among the Turks, for staining paper, and also for making a fine sap-green colour.

Formerly, it was erroneously believed, that the frequent eating of this fish proved a certain remedy for dimness of sight; and, with that view, many persons used it as their daily food; though without consulting their health. Of all animal substances, carp is doubtless the most liable to putrescency; and as its fat is indigestible, it ought particularly to be avoided by febrile patients, invalids, and convalescents.

Carp is the most valuable of the finny tribe, for stocking ponds, on account of its speedy growth, and uncommonly rapid increase; the sale of these fish is a source of considerable profit to landed proprietors on the Continent; and, if the rearing of them were better understood and practised in the marshy parts of this country, they would amply repay every expence and trouble thus bestowed. The

most proper situations for *carp-ponds*, are those surrounded by rich pastures, or corn-fields, having soft springs on the spot, or being at least in the vicinity of pure running water: they should be exposed to the sun, and sheltered from the easterly and northerly winds.

Those persons who propose to breed carp on a large scale, ought, in the opinion of the Hon. ROGER NORTH, to be provided with three reservoirs, namely: 1. A *Spawning-pond*, which should be cleared of all rapacious fish, and other animals; 2. A *nursery*, intended for the reception of the young carp, which should be removed from the spawning pond, in the month of March or April; and, 3. The *main-pond*, which is designed for such fish as exceed 12 inches in length.

The best carp for breeding, are those from five to seven years old, with long bodies, fine full eyes and scales, without any blemish or wound: three or four such male fish, with six or eight females, will be sufficient to stock a pond one acre in extent; they should be conveyed thither on a fine calm day, toward the end of March, or early in April. One thousand, or twelve hundred, young fish may conveniently inhabit a *nursery* of a similar capacity; but, when they are first put in, it will be necessary to watch and drive them away from the sides, lest they become the prey of rapacious birds. The most favourable seasons for stocking main-ponds, are the spring and autumn; when a space, of 15 square feet (perhaps four cubic feet), will be sufficient for each carp: the growth of the fish depends on the room, and quantity of food allowed them.

The winter seasons sometimes prove so severe, that the water freezes as often as the ice is broken for the admission of air; in consequence of which the carp frequently perish. In such case, the fish may be preserved in a cellar, by the following expedient: Let each be enveloped in wet moss laid on a piece of net, and then be secured in a purse, so as to admit the air. The net must be immersed in water, at first every third or fourth hour, and suspended to the ceiling, though afterwards such dipping may be performed once in six or seven hours. Their food ought to consist of bread, soaked in milk, which should be given in small quantities, and gradually increased, as the animal becomes accustomed to this mode of living. By such treatment many fish have been preserved alive for a considerable time, and have even grown fat, so as to become more fit for the table.

CARPET, a covering for floors, &c. manufactured of wool, or other materials, and worked with the needle, or in a loom. The carpets in the greatest estimation are those of Persia and Turkey; but a manufactory has been established at Paris, where they are made in the same manner as the true Persian carpets, to which they are little inferior. There is also a good sort made in Germany; these are often embellished with silk, and some are even made of dog's hair. In England, carpets are manufactured of a superior quality; the most elegant and valuable of which are those known by the name of *Brussels*.

CARRIAGE, a vehicle which is employed in conveying persons, goods, merchandize, &c. from one

place to another, and is usually constructed with two, or four wheels.

Carriages have various names, which, together with their structure, are so generally known, as to render any description of them unnecessary. From their great utility, more particularly when applied to the purposes of family convenience, they have excited the attention of the most ingenious artisans, who have sedulously studied to improve them. Hence a variety of experiments have been made, in order to ascertain the best, and most proper mode of constructing them, and preventing the different obstacles, which tend to impede their motion. To discuss these, would be to embark into too wide a field of enquiry into the principles of mechanics, and to deviate from that plan of conciseness we have adopted. Those of our readers, who may be desirous of acquiring minute information on this subject, will be gratified by a perusal of Mr. ANSTICE's *Remarks on Wheel Carriages*, 1789, 8vo. 2s. 6d. in which it is fully and ingeniously investigated; and the rules for constructing wheel-carriages are laid down, according to the strictest principles of mechanics.

In August, 1800, a patent was granted to Mr. ISAAC HADLEY REDDELL, for a new method of constructing carriages, intended to convey merchandize, either by land or by water; and which may be removed (whether loaded or unladen) from the water to the land, and *vice versa*, with ease, expedition, and safety. The patentee makes the bodies of any size or shape required, principally of wood; but, to strengthen, and render the different parts water-tight, they are connected with iron, or other suitable material. A proper number of wheels are next affixed either in recesses or in narrow boxes or compartments, that are so constructed as to resist the water: these wheels are farther so arranged, that the bottom of the carriages be not more than six, nor less than three inches, above the ground..... When in the water, the carriages thus adjusted, may be fastened together, and drawn by one horse; but, in the contrary case, it becomes necessary to separate them, and draw them up an inclined plane. A more particular description of this curious contrivance, is in the 14th vol. of the *Repertory of Arts*, &c.

In the year 1800, the society for the *Encouragement of Arts*, &c. conferred a bounty of thirty guineas on Mr. GEORGE DAVIS, for his invention, calculated to prevent passengers in carriages from being injured, when horses have taken fright. As a mere verbal account would not convey an adequate idea of this useful machinery, we are under the necessity of referring the reader to the 18th vol. of the *Transactions of the Society for the Encouragement of Arts, &c.* where the whole is illustrated with an engraving. Let it suffice to remark, that the apparatus is fixed behind the splinter-bar of a carriage; and the communication is, by means of a copper chain, carried through the boot, to the side of the coach-box; so that, in case the horses take fright, or the reins break, the coachman can discharge the animals instantaneously. An advantage peculiar to this contrivance is, that the *horses can be liberated even when the poles are at right angles*,

or are locked close to the perch; *a position which otherwise overturns a carriage*. Mr. DAVIS's invention has been exhibited with complete success, in the presence of His MAJESTY, a Committee of the Society, and many other spectators; but, as apprehension was entertained that passengers might suffer injury from the motion of the carriage, *after* the horses were disengaged, Mr. D. has added a *gripe* for stopping the wheels; so that, by one pull of the chain, the animals may be discharged, and two bolts be propelled on the nave of the two fore-wheels, in such manner as effectually to retard their motion.

CARROT, or *Daucus*, L. a genus of plants comprising ten species, of which the *Carota*, or common carrot, only is cultivated in Britain, where it was introduced from Flanders, in the reign of Queen ELIZABETH.

Carrots are propagated from seeds, which may be sown at different times, during the whole season; in order to procure a succession of young roots for the table. They require an open situation, at a little distance from a wall; the seeds should be previously rubbed between the hands, to take off their beards, as they will otherwise adhere to each other, and come up in patches; but if sown close under the wall, they will too quickly run up to seed, and produce indifferent roots. These plants delight in a warm, light, sandy loam, which should be dug to a considerable depth, to facilitate the roots striking downwards, as they are apt to become forked, and to shoot out lateral branches. They grow most luxuriantly after turnips, which render the land more clear of weeds than it is found after any other crop. As a culinary article, the carrot is well known; it also furnishes a wholesome and nutritious fodder for cows: if given to them in the winter, and early in the spring, it greatly increases their milk, and imparts to it an agreeable flavour. Hogs thrive well on carrots, which they fondly eat, when boiled in their wash. A sparing allowance of these roots, besides the usual food, is said to produce an invigorating effect on hunters: plough and cart horses also eat them with avidity; and while thus fed require no corn, and very little hay. Oxen and sheep fatten very speedily on carrots; and, if the latter animals are "half fat," when put up, they will be completely so, in about three months. This vegetable has also been cultivated for feeding deer, in parks; a practice, which in severe winters, when every other kind of food is scarce, has been attended with advantage. As a fodder for cows, sheep, and swine, the tops of carrots are equally valuable with the roots. Nay, sometimes even hay has been made by mowing these tops, towards the latter end of June; yet they should not be cut so closely as to injure the crown of the root.

Although carrots, when left in the ground, will not endure the severity of winter, like cabbages and other vegetables, yet, by proper care, they may be preserved, so as to afford a wholesome and strengthening fodder for cattle. The method alluded to, is amply described in the eleventh volume of the *Annals of Agriculture*, from which we extract the following account: Soon after Michaelmas, when the weather is dry, the carrots are dug out, and piled up on a bank of

earth, raised about six inches above the level of the soil, and proportioned to the quantity of carrots intended to be preserved. On this bank is spread a thin layer of straw, on which the carrots are placed, with their tops turned outward, and the ends folding one over another. The small roots are topt, and laid in the middle, to prevent the two sides from separating, by the greater pressure of weight on the centre. Every second or third row is covered with a little dry straw, and the stacking thus conmued, till it reaches to the height of about four feet, when an additional quantity of dry straw is carefully spread over the tops, and the whole is thatched with sedge. Another line is then commenced in the same manner as the preceding, and sufficient room left for one person to pass between them. The intermediate space is next filled up with dry straw, and the outside defended with bundles of the same material, staked down, or fastened with hurdles. Thus secured, carrots will protect themselves from frost, by their own tops, and ensure a constant supply of fodder, at a period when almost every other vegetable is destroyed.

[Upon a gravelly soil on a hill, Major SPOONER, of Roxbury, Massachusetts, sowed carrot-seed in a furrow made by the plough, leaving a space of two feet between the furrows. On the 15th June, the sowing was completed. The carrots were neglected until buried in weeds, and a severe drought succeeded. On the 15th July, the patch was ploughed and weeded: on the 1st of August, between five and six hundred cabbages were transplanted in the spaces left.

The necessary hoeing for those, kept the carrots also in tolerable order. In the autumn, they proved to be of the middle size of garden carrots. After cutting the tops, the whole produce measured forty bushels. Mr. FORD is of opinion, that in common fields, with the usual proportion of manure, the average produce would be twenty bushels per acre. If this be the fact, no husbandry will keep so many head of cattle on a given quantity of land, and at so little expence.

Mr. DEAN says, "a sandy soil is very proper for carrots; but they do very well in gravelly and loamy soils, when loosened to a sufficient depth. The ground should be ploughed or dug more than twelve inches deep, and well pulverized.

I have found by long experience that carrots should be sowed early. The last week in April is late enough; and they may be sowed earlier, if the ground be in good order, and so dry as to be made light and loose. The earliest sown will be the largest, and nearly as tender and good tasted as if sown later.

A small quantity of dressing will be sufficient for them. But whatever manure is used, should be well rotted, and made fine, or putrefy very soon in the ground; otherwise the little obstacles in it, will cause the roots to divide, and become forked. I have known carrots manured with hog-dung, grow to a surprising bigness. But if a large quantity of this strong manure be used, they will grow so fast as to burst open.....It is a crop that bears drought well, as it draws its principal nourishment from a considerable depth.

Carrots may be sown pretty thick, as they are remarkable for growing better in a crowded situation than almost any other kind of roots. And it is easy to thin them at any

time when it is thought proper, as they are so shaped as to come up easily.

In the garden I sow them in drills, or little furrows, made an inch deep with the head of a rake, from 9 to 12 inches apart, across beds four feet wide. This prevents treading the ground hard too near to the roots; greatly facilitates clearing them of weeds with a hoe, and keeping the earth loose to a sufficient depth. I do not thin them much, till I begin to pull them for use, about the beginning of July; from which time I pull them, not only for the table, but to feed swine, as that sort of animals are so fond of them, that they will greedily devour both roots and tops.....The spaces between the beds may be kept clear of weeds, by turning over the soil with a narrow spade, once or twice in May and June. It will not only subdue the weeds, but increase the pasture of the nearest plants.

But the field culture of this root begins to prevail in the country. As carrots are found to be valuable for feeding not only swine, but horses and cattle, and for fattening them; but to fatten swine on them, they should be boiled, or par-boiled. They are so easily cultivated, and so hardy, that they may be raised in fields. They will grow well in a soil that is but moderately rich, if it be ploughed deep, and made mellow. And there is no difficulty in keeping them through the winter, in good order for feeding cattle. The ground should be ploughed in the fall preceding, and ploughed very deep. If the plough do not go deep enough at once, it should be trench ploughed; that is, the plough should pass twice in the furrow. And if some of the earth which was never before stirred, should be thrown up to the surface, it will be no damage, provided it be such earth as crumbles easily, and does not remain in lumps, after the winter frosts.

If the land incline to much wetness, it should be water-furrowed, after ploughing, that so it may be dry, and fit to be ploughed again very early in the spring. It must be well harrowed before sowing, first with a heavy harrow, and afterwards with a lighter one, with shorter teeth placed near together. After the seed is sown, the ground should be raked. When sown in the broad-cast method, they should stand so far apart after thinning, as to have each half a foot of soil. There will be no danger in thinning them early, as they are a plant which is seldom diminished by insects.

After the first hoeing, the European farmers harrow them. It is said not one in fifty will be destroyed by the operation. It will loosen the soil, and greatly forward their growth. But it will be advisable to go among them after harrowing, and uncover those which are buried under heaps of mould. A Mr. Billing, in England, one year sowed thirty acres of carrots, and had an extraordinary crop. Some of the best of the land yielded him twenty-four cart-loads per acre. If his cart contained 40 bushels, which is a common size in this country, he had 960 bushels from an acre. And this is not a greater crop, than a gentleman at Newbury had last year, unless I am misinformed.

Mr. Billing had 510 loads of carrots per 30 acres, which he thinks equal in use and effect to near 1000 loads of turnips, or three hundred

loads of hay. If so, he had as good a crop as ten loads of hay per acre would have been. But the half of this quantity is seldom if ever obtained in hay; or if it were, it must be very coarse, and not near so valuable as hay in general.

This farmer found, that his carrots answered extremely well, not only for fattening swine, but bullocks; and for feeding milch cows, sheep and horses; and that the land was left in a better condition for a succeeding crop, than land after a crop of turnips.

It is with pleasure that I find the attention of some of my countrymen turned to the field culture of this excellent root. They who have but little land may probably enable themselves to keep considerable stocks by means of it.

This root has greatly the advantage of turnips, not only in its being a richer and more nourishing food, and in yielding a larger produce, but also in its being never annoyed or hurt by insects. This crop rightly managed, I have never known to fail, as it is well known the other often does.

The drill-method is preferred by some, and is that which I use. But the labour will perhaps be increased a little. The seeds must be sown by hand, as their shape will not admit of their being drilled. To prepare them for sowing at all, they should be well *rubbed*, and *passed* through a *sieve*. The first hoeing of carrots in rows must be also by hand; at which hoeing they should be thinned to one or two inches asunder, if large ones are desired. It is not amiss, if they grow large and rank, when they are chiefly designed as food for cattle, though small sized ones are preferred for the table.....The way to keep carrots good for eating through the winter, is to bury them in dry sand of the yellow kind from pits."

Carrots when intended for winter food must be taken up in the autumn and packed in a cellar or barn.....In this situation they wither a little, and it is said yield more nourishment than when given fresh. Horses are said to be very fond of carrots, and to prefer them to oats].

Various, but unsuccessful, experiments have been made to prepare sugar from carrots; as they yielded only a thick syrup, similar to treacle. Nevertheless, these roots have lately been more advantageously employed in distillation. After mashing, and properly fermenting them, M. Brieger, a foreign distiller, obtained from ten pounds of the roots, one quart of what is called "first runnings," and half a pint of a very strong ardent spirit.....As a German acre of land produces, upon an average, 10,000 pounds weight of carrots, he is of opinion, that a loose soil might be more advantageously employed in the culture of those roots, than in that of any seed-corn.....See also Brandy.

In medicine, a marmalade of carrots, on account of their strong antiseptic qualities, has been successfully used for preventing, and curing the *sea-scurvy*. An infusion of them has also been found to afford considerable relief to persons afflicted with the stone, and worms, but especially the tapeworm.....A poultice, made of the roots, has often been attended with similar success, in mitigating the pain, and abating the smell, of foul and cancerous ulcers.

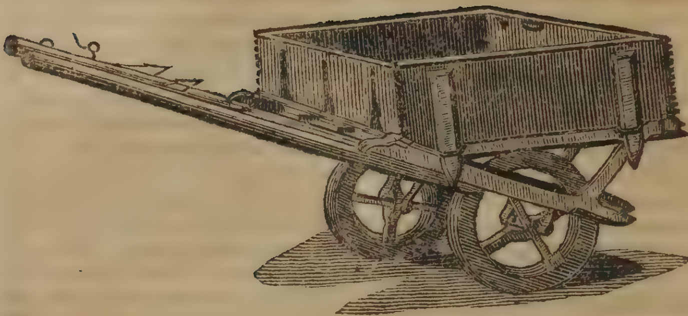
CART, a land carriage, with two wheels, drawn either by horses or

oxen, for conveying heavy goods, &c. generally at short distances.

In rural economy, the proper construction, and adaptation of carts to different soils and situations, are objects of the first consequence to every reflecting farmer. Nevertheless, it is surprising, that little attention has been paid to this important subject, previous to the late improvements in agriculture; the flourishing æra of which, in Britain, commenced about the middle of last century, or the year 1754, when that patriotic *Society for the Encouragement of Arts, Manufactures, and Commerce*, was instituted at London. Since that memorable period, numberless inventions have been introduced into rural economy, and the names of Lord ROMNEY, Messrs. SHIPLEY, MORE, and many other illustrious promoters of *true* national wealth, will ever be remembered by a grateful posterity. One of the most active members of this respectable institution is Mr. ARTHUR YOUNG, of whose public spirit, and indefatigable labours, we have before us the most ample and satisfactory proofs. His "*Annals of Agriculture*," though conducted on a plan too diffuse for ordinary readers, is a work replete with practical facts; and on the whole, the best illustration of British husbandry. In the 18th volume of these Annals, we meet with an elaborate paper, entitled "*The Farmer's Cart*;" by the editor; from which we shall extract the following particulars: Mr. YOUNG first observes, that the most general farmer's carriage in England, is a waggon drawn by four horses, in which is conveyed corn, hay, wood, &c. but not dung or earth, which are usually moved by carts, or tumbrils, drawn by three, or four horses....carriers almost universally employ broad-wheeled waggons, drawn by eight horses.

In Scotland, waggons were formerly used, but afterwards changed for large carts, and more lately for small ones, drawn by one horse.

In Ireland, the most common vehicle at present is the *one-horse car*, with low wheels beneath the body of the machine; which has univerally superseded the use of English carts and waggons, from a conviction of their inferiority. Nothing, says Mr. YOUNG, exceeds the amazing expedition with which corn and hay fields are cleared in that country, by means of this useful, though inelegant implement. In consequence of such a decisive encomium, as well as the very favourable account given of this machine by the late Mr. BAKEWELL, of Dishley, Leicestershire, in the "*Communications to the Board of Agriculture*," we have been induced to present our readers with the following cut, and description, of an *Improved Irish Car.*



The advantage of this vehicle, which was preferably employed, and strongly recommended, by the last mentioned agriculturist, consist in the facility with which it is laden, on account of its lowness; and, when gate-ways and roads are narrow, much room is gained by the wheels being fixed under the body of the cart. In such situations, therefore, it is well calculated for carrying manure, espcecially on meadow or ploughed land; and, for that purpose, its wheels ought to have a flat bearing and to be at least six inches in breadth. Another peculiarity in the construction of this cart is, that its wheels are necessarily cylindrical; and that the facility of draught arising from this unobserved circumstance, was probably imputed to some other part of the machinery. But, though contrary to the generally received opinion, Mr. ALEXANDER CUMMINGS (in his *Observations on the Effect which Carriage-wheels with Rims of different shapes have on the Roads*, printed in the *Communications to the Board of Agriculture*), [See WHEELS,] has satisfactorily demonstrated, and it is likewise evinced by experience, that *the resistance to the cylindrical wheel is not increased, but diminished, by increasing the breadth and the flat bearing of its rim.* The knowledge of this fact is of very great importance to the farmer, as well as to the waggoner; for, by availing himself of this simple improvement, he may be enabled, in almost all seasons, to drive his broad wheeled carts, &c. on his meadow or ploughed ground, when no narrow wheel can be employed....... [The draught is also much inclined, which is a circumstance of great consequence. See DRAUGHT.] Hence it would be superfluous to enumerate the farther advantages of this implement; yet, when the width of gate-ways and the breadth of roads will admit of the wheels being placed at the sides of the cart, *without confining the width of its body*, it will probably be more advantageous to have them at the sides, than under the cart.

One of the greatest advocates for *one-horse carts*, is Lord ROBERT SEYMOUR, whose excellent paper on this subject, dated Taliaris, 5th September, 1796 (inserted in the 27th volume of the *Annals of Agriculture*), deserves the thanks of all

British farmers. This patriotic nobleman strongly recommends the cart which he employs on his estates, as a most useful implement of husbandry. Convinced of its superior excellence, in many situations, we have thought proper to annex an accurate engraving of this cart, for the elucidation of which, we shall extract the following particulars from his Lordship's letter, addressed to the editor of the last-mentioned work:

The advantages of single-horse carts are universally admitted, wherever they have been attentively compared with carriages of any other description. By his own observation, Lord SEYMOUR is led to conclude, that a horse acting singly will do half as much more work as in conjunction with another, so that two horses will, separately, perform the work of three conjunctively. This difference, he believes, arises partly from the single horse being so near the load he draws, and partly from the point or line of draught being so much below his breast; as the wheels of single-horse carts are usually made very low. When a horse draws in conjunction with another, he is generally embarrassed by some difference of rate....the horse behind or before him, being quicker or slower than himself: whereas a single horse has only his load to contend with, and is not inconvenienced by the greater or lesser height of his fellow. Nor is there any necessity for employing additional drivers; as horses, once in the habit of going singly, will follow each other as uniformly, and steadily, as they do when harnessed together: hence, on the most frequented roads in Ireland, one man conducts three, four, or five single-horse carts, without any inconvenience to the passenger.

Dimensions of the body of the cart employed by Lord ROBERT SEYMOUR :.......Two feet eleven inches across the bottom; three feet nine inches, inside length; one foot high; sloping top, nine inches.

Iron wheels......Two feet eight inches high; rim, three inches and a half wide, and from three-quarters to an inch thick; spoke, three inches and a quarter at each end, worked off to two inches at its centre.

In the introduction to the letter above alluded to, his Lordship observes, that the price of iron cast into wheels is 16s. per cwt. and the weight of each wheel is about three-quarters of a hundred.....Two inconveniencies, however, arise from the use of low cast-iron wheels; namely, 1. That such iron is very liable to break upon concussion; and 2. The the course of a wheel of so small a diameter, occasions a very quick consumption of grease. The first of these objections is, in a great measure, removed by the facility with which the rim of the wheel may be repaired by the application of wrought iron; the latter being joined to the former by a rivet, the wheel acquires a degree of elasticity, and thus becomes, perhaps, stronger than it was when new. In order to furnish a regular supply of grease, Lord ROBERT has introduced four grooves or cavities in the boxes, increasing a little towards their centres: and with a view to defend the axletree, which consists of wrought iron, against the harder body of the box, he ordered the extremity of it to be steeled.

Mr. ARTHUR YOUNG, in the 18th volume of his *Annals of Agri-*

culture, before quoted, states the following dimensions of a single-horse cart, which he, by the test of experience, has found to be the most advantageous:

Buck....Length, 5 feet 1 inch.
Breadth, 3 feet 7 inches.
Depth, 2 feet.
Cubical feet, 35 and a fraction.

On his farm of 350 acres, in Suffolk, Mr. Young employs only five such carts; and observes, that he would not add more than one to the number, even though he should increase his business to 4 or 500 acres: hay, corn in the straw, faggot-wood, billets, dung, clay, marl, lime, bricks, &c. are all conveyed by them; carrying out 9, and even 10 coombs of wheat in sacks, and they are never drawn by more than one horse or ox.....No farm of the same extent, in an arable country, has less than three waggons, three tumbrils, and a light cart: the exact price of these different implements, in the year 1792, amounted to 109*l. st.* while the building of *six* carts, upon Mr, Young's plan, costs only 63*l.* thus he saves about 40 per cent. in annual repairs. Besides this great reduction of expence, another circumstance deserves particular notice....As these carts had for many years been the object of ridicule, Mr. Young offered a bet to one of his prejudiced neighbours, that he should load a waggon, till five horses could not stir with it; and Mr. Young engaged to carry away that load *with ease*, in his carts, with four of the same horses; but the confidence, which his antagonist possessed in waggons, would not allow him to accept the offer.

The infinite benefit, concludes Mr. Young, of which these carts would be to the roads, if their use should become general, may be easily conceived. In all the examinations before Committees of the House of Commons, as well as in most of the treatises published on the subject, it has been admitted that no police or management can keep the roads in repair, while such vast weights are permitted to be drawn in a single carriage. Parliament has been made so sensible of this fact, that repeated acts have been passed, by which the weight of waggons was limited, and a certain breadth of the wheels enjoined. Experience, however, has proved, that both are insufficient, and that the only method of effecting a favourable change, would be to prohibit numerous teams. Let every man carry whatever weight he pleases in a one-horse cart, and pay a light toll: let the load of a two-horse cart be limited, and the toll increased; farther lessening the weight, and raising the toll, when four horses are employed; and thus advancing the turnpike expences for every additional horse, till it amounts nearly to a prohibition. If such a plan were to be adopted, we should soon see all our roads in an improved state. *Rollers* have, indeed, been greatly indulged both in weight and toll; but this was a preposterous measure, for a roller will crush a pebble to dust as well as a wheel, and the badness of roads must be attributed to the materials being reduced to powder, almost as soon as laid on, and either blown away in dust, or carried off in mud.... Having followed some of Sharp's waggons, and observed the effect,

Mr. Young is persuaded that the roller is more detrimental to the road than nine-inch wheels. In such an inquiry, facts only can decide the question: the Irish roads are made at an expence beyond comparison less than the English, and were, at the time he visited that country, greatly superior to those in England. This difference, in his opinion, must be attributed entirely to the use of one-horse carts, as he has explained in his "*Tour of Ireland*." "Many hundred thousands a year would be saved in England, if these carts were so favoured in road-acts, as to ensure a great decrease of waggons." On the whole, he ventures to recommend the use of one-horse carts to his brother farmers, with that confidence which ought to arise solely from numerous and varied experiments.

[A predilection has long prevailed in England and America, in favour of large teams and waggons, in regard to which, says Dr. Anderson, the great object of emulation seems to be, to try how an immense load of goods may be transported in one carriage, without regard to any other circumstance. But this is acting in direct opposition to the best established principles of mechanics, of economy, and of common sense.

The parts of large machines must be made so proportionally thick, because of the largeness of size on which they are constructed, that the very weight of the machine, itself, is a load which not only subjects the owner to a great and unnecessary expence in the purchase, but what is worse, obliges him to be at a great expence for horses to drag that unnecessary load from place to place. When four or more horses are yoked to a team, three of these horses must draw horizontally, and consequently in a manner inconsistent with their mechanism, which will be explained under the Art. Draught.

The immensely large wheels of waggons, also add exceedingly to the draught of the horses, because a waggon from the slowness of its motion, obliges the horses to overcome its *vis inertiæ* every moment they are drawing it. That is, it is the same thing as putting it into a state of motion from a state of rest every moment; for every one knows how small a force is capable of keeping a heavy body in motion.

The very great weight of our Western country waggons is well known. Let any one then reflect upon the great portion of the horse's strength which is spent in drawing the waggon besides the load it contains, and which ought to be applied to support an increase of the latter. Why could not each horse draw his own cart? There can be no doubt, that four horses with each a properly constructed cart, will draw more and with more ease to themselves, than when they are yoked to one waggon.

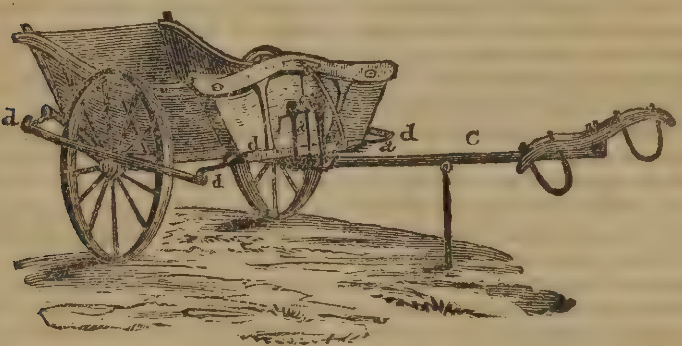
A good horse will draw as a common load 15 cwt. of goods, and travel farther in a day than our waggons, and over worse roads, whereas 10 or 12 cwt. of burthen is as much as falls to the share of one waggon horse; his superior strength being wasted upon a cumbrous wheel.

The rough roads beyond the mountains may probably prevent the adoption of the plan of one-horse carts, but why could not each

horse draw his own cart, from the farms of Lancaster County?

The halter of one horse might be tied to the cart which goes before it, and by this means one driver would have the whole as much at command as if they were yoked in the chains of a waggon. A horse has also the momentum of his draught increased by having a portion of the weight on his back....... The expence of turnpike may be increased by the carts, but would not the increased freight more than make up?]

In the 2d. vol. of "*Communications to the Board of Agriculture*," we meet with a description of a *Drag-cart*, and an ingenious method of regulating the centre of gravity of the load; by Lord SOMERVILLE. This memoir is illustrated with plates, from one of which we have selected the following figure, representing a perspective view of a cart designed to be drawn by two strong oxen, with a pole, yoke, and bows; such carriage being calculated to convey 45 cwt.



In the front of the body of this cart is represented the manner in which the centre of gravity of the load is adjusted; in order to prevent it from pressing too much on the animals, when descending a hill; the front of the cart is elevated by means of a toothed rack screwed on it, and worked by a pinion, and the handle *a*, being immediately connected with the pole *c*....By the aid of this pinion and rack, the front of the carriage is raised in a greater or less degree according to the declivity; so that the weight of the load bears more on the axle, and less on the necks of the cattle.

On the side of this cart is delineated the position, in which the *friction-drag* is applied, and is made to press in a greater or less degree, according to the steepness of the descent....*d,d*, is the *friction-bar*; one end being connected with the tail of the cart, by means of a small chain: and the other being fastened to the front by a toothed rack *b,d*, that catches on a staple in such front; so that the friction bar may be made to act more or less powerfully on the side of the

wheel, at the discretion of the driver....the notches, or teeth, on this rack should be set as closely together, as circumstances will permit.

The friction-bar, in the figure above given, is stated by Lord S. to be placed lower on the wheel than it was originally designed, with a view to divide the pressure and friction more equally on the opposite side of the wheel: so that the action on each is diminished; and the risk of over-heating and destroying the friction bars is rendered less, than if the whole pressure were applied in one point, on the top of the wheel. The advantages arising from the drag here described, are as follow:

1. The pressure and degree of friction may, with great expedition be adjusted to the steepness of the declivity; so that the carriage will neither press forward, nor require much exertion in the draught.

2. The friction is, with great propriety, applied to the wheel in such a direction, that a *given* pressure will produce *twice* the effect in retarding the progress, which it would have, in case it had been immediately applied to the body of the cart, or to the axis.

3. This apparatus is so easily arranged, that it may be immediately adjusted, without stopping the carriage, or exposing the driver to danger.

4. Lord Somerville's useful contrivance will be of still greater utility when applied to *both* the hind wheels of waggons: for by this expedient, the resistance may not only be always adapted to the steepness of the descent, so as effectually to prevent both the tearing up high-roads, and the unnecessary exertion of cattle, when drawing locked carriages down hills; but also the frequent accidents to which drivers are exposed, will be completely obviated; and that time, which is now spent in locking and and unlocking waggon-wheels, will in future be saved.

Having concluded the subject of single-horse-carts, we shall only observe,for the information of those who employ teams with two-wheeled carriages, that several useful implements have lately been invented, for the more effectual stopping of such carts, in descending steep hills, and likewise for taking off the increased weight thrown on the shaft horse's back in all descents. A description of these excellent contrivances, illustrated by the necessary cuts, we shall communicate under the respective heads of Locking-pole, and Wheel-drag.

In London and Westminster, carts are not permitted to carry more than twelve sacks of meal, 750 bricks, one chaldron of coals, &c. on pain of forfeiting one of the horses (stat. 6 Geo. I. c. 6). By the laws of the city, carmen are forbidden to ride either on their carts or horses: they are to lead or drive them on foot through the streets, under the penalty of 10s. (stat. 1 Geo. I. c. 57.)

Rolling-carts are very useful machines for carrying manure on low-lands, during wet seasons..... According to an account given by Mr. Richard Moyle, and inserted in the 14th volume of the *Transactions of the Society for the Encouragement of the Arts*, &c. such a cart consists of three circular pieces of strong elm, two feet in diameter, and each eighteen inches long, through which a strong iron axis is passed, so as to pro-

trude a few inches on each end beyond the rollers; after all, allowing an inch between each piece, for the conveniency of turning round. On the projecting part of the axis, a fixed frame is placed, for supporting the body of the cart which, according to the nature of the soil, may be loaded to any degree, and employed simply as a roller, or for carrying manure, &c. on land where common wheels cannot be admitted.

By means of these rolling carts, the surface of the land is to be frequently compressed, in order to consolidate the soil more perfectly, so that the earthy particles may embrace the roots of the grasses, and retain their proper moisture; on which the luxuriancy of such soils in a great measure depends.

CARTILAGE, is a smooth, elastic, and insensible animal substance, somewhat approaching to the nature of bones.

Cartilages have a natural elasticity, the power of which is so great that, on being forced out of their situation, they spontaneously return to it, as soon as that force is removed. They are principally situated in those parts of the human body, which require a slight and easy motion, as in the ears, nose, &c. Their elasticity supplies the place of antagonist muscles, or such as are by Nature designed to counteract each other. Cartilages also invest all the ends of those bones, that are conjoined for performing motion; because, as they are both smoother and softer than bones, which are insensible, the attrition occasioned by the motion of the joints is thus more effectually guarded against. See likewise CHARCOAL.

CASCARILLA, is the bark of the *Croton eleutheria*, L. a native of the East-Indies, [said to be also found in Georgia,] whence it is imported in the form of curled pieces, or rolled up into short quills, about an inch in width; externally resembling the Peruvian bark.

Divested of its whitish upper rind, the Cascarilla possesses an agreeable smell, and a bitterish, pungent, aromatic taste. This inflammable drug, when burning, emits a fragrant odour, not unlike that of musk; on account of which property it is often employed in fumigations, or as an ingredient in tobacco, with the fanciful view of purifying a corrupted atmosphere.

The cascarilla is frequently and successfully administered in intermittent fevers, even as a substitute for the Peruvian bark; being less liable to produce the inconveniencies which the latter is apt to occasion by its astringency. The former drug, according to medical writers, has also been prescribed with uncommon advantage in dangerous epidemic and *petechial* fevers, in flatulent colics, internal hemorrhages, dysenteries, diarrhœas, and similar disorders. The virtues of the Cascarilla are partially extracted by water, and totally by rectified spirit; though it operates most effectually when given in powder; the doses being regulated, according to circumstances, from ten to thirty grains every four, six, or eight, hours.

CASE-HARDENING *of Iron*, is a superficial conversion of that metal into steel, by a cementation of it with vegetable or animal coals. This operation is usually performed on small pieces of iron, worked into tools and instruments, by put-

ting them together with the cement, into an iron box, which is closely shut, and exposed to a red heat, for several hours. Thus, the surface of the iron, to a certain depth, is converted into steel, to which a proper degree of hardness may be given, by a sudden immersion of the heated pieces into a cold fluid. See CUTLERY, IRON.

CASSAVA, or *Iatropha Manihot*, L. a native shrub of South-America, eminently deserving to be transplanted to our climate; for it is asserted that one acre of its roots produces a quantity of food equal to that usually obtained from six acres of seed-corn. This shrub grows from four to seven feet high, is knotted, covered with an ash-coloured bark, and pithy within: its broad palmated leaves, together with its white and rose-coloured blossoms, render it a very beautiful plant. According to M. BRUNELLI, it may be propagated by seed, but more expeditiously by suckers: when these are planted in a deep, rich, and light soil, they vegetate with surprising luxuriance, and produce in the course of one year, a white, soft, and farinaceous root, from one to two feet in length, and from five to six inches in circumference.

The very extensive use of the cassava, as an article of food in South-America, is a striking instance of human ingenuity successfully directed to prepare wholesome nutriment from such vegetables as, in their natural state, are very active poisons. A mild, nutritious food is obtained from these roots in the following manner: Immediately after being gathered, they are washed and stripped of their thick rind by means of a knife: the heart, a pulpy mass, either white or yellowish, is repeatedly passed between cylinders, and turned by mill-work, till all the juice is expressed. The dry pulp, being thus freed from the poisonous juice, is a compound of farina and vegetable fibre, and requires no farther preparation than to be thoroughly dried, over a very slow fire. In this state it will keep for several months in close vessels; and, when wanted, it may be formed into cakes, by kneading up with water, and baking it; or into pottage, by boiling it with water, and a little Cayenne pepper. The pure farina is the *tapioca* of the shops: it is separated from the fibrous part, by taking a handful of the pulp, after the juice is extracted, and working it in the hand, till a thick white cream appears on the surface: this being scraped off and washed in water, gradually subsides to the bottom, and after pouring off the liquor, the remaining moisture is dissipated over a slow fire, constantly stirring the farina, so that at length it concretes into grains, about the size of sago, which become hard by keeping. This is the purest and most nutritive part of the pulp, and forms a very wholesome and palatable food, which, if preserved in a dry place, may be kept for any length of time.

By heaping together the cassava cakes, till they begin to heat and become mouldy, and then infusing them in water, to induce a very rapid fermentation, the Indians prepare a very sharp and disagreeable, but intoxicating liquor, which will not keep longer than a day, without spoiling. Although this liquor, previous to distillation, has a sweet and mild taste, yet, when

drunk in any quantity, it occasions excessive swelling of the body, convulsions and death. According to M. BRUNELLI, hogs and some other animals, eagerly devour the fresh root, without the least injury. But Dr. BANCROFT, in his *Essay on the Natural History of Guiana*, &c. (8vo. 6s. 1769), states, that the expressed juice of the cassava-root, when drunk by sheep, hogs, and poultry, proves inevitably fatal to them; yet the animals thus poisoned are always eaten by the inhabitants....The best antidotes against the virulent effects of the cassava, in its crude state, are red pepper and rum, if immediately used. Fatal as this root is in its natural condition, it is rendered perfectly innocuous, and wholesome, by fire. By baking the meal, says the last mentioned author, it is converted into nutritious food, and the poisonous juice of the root is, by both the Indians and colonists, boiled with venison, pepper, &c. by which process they prepare an agreeable and salubrious soup.

We have enlarged upon the properties of this beneficial vegetable, because we think its general introduction into our West Indian settlements would be attended with the happiest effects; and that it might, by proper management, also be transplanted to the northern hemisphere. This, however, is certain, that exotics of almost every description might gradually be naturalized in colder climates, if the following particulars were strictly attended to: namely, 1. That they be placed in a soil and situation congenial to their original habit; 2. That in removing them farther northward, only the seeds and suckers of plants already accustomed to a cooler region, should be selected; and 3. That this method of transplanting them, be regulated upon certain principles, to be derived from a careful examination of the greater or less intimate connection, or affinity, subsisting between vegetables of the same class, or genus. Thus, the potatoe, artichoke, vine, mulberry-tree, and many other of the most useful vegetables, have been inured to climates very remote from their origin; and the three last mentioned are now enabled to withstand the severest winters.

As we intend, on similar occasions, to refer to this article, with regard to the method of depriving certain vegetables of their poisonous juices, we shall conclude this account with a few practical directions to that effect; because these will be applicable to any other tuberous and farinaceous root, as well as to seed, or fruit. Instead of grinding, or bruising such substances, in the rude manner adopted by the Indians, the roots, in particular, should first be properly peeled, and then grated upon a sieve. By moderately pressing this pulp with the hand, the juice, together with some feculent matter, will pass through; the latter will speedily subside, so that the liquor may be poured off and fermented, by which method it will probably be deprived of all its poisonous qualities: should this, however, not be the case, there is no doubt, that from the expressed juice of all *mealy roots*, (if the fermenting process be duly conducted) a very pure ardent spirit may be obtained by distillation.

The pulp which remains on the sieve, must be either repeatedly washed with cold water, or soaked

in several waters, without suffering it to ferment, till the liquor comes off quite clear: all these washings being put together, will deposit a mealy sediment; which after pouring off the water, should be dried in a gentle heat; but the fibrous residuum on the sieve can be used only as fuel. Thus, the purest tapioca may be extracted from the cassava, and similar granulated masses may be obtained from European vegetables; many of which we have already mentioned in our work, under the article BREAD.

CASSIA, in botany, a genus of plants, comprising thirty species, the most remarkable of which are:

1. The *cassia fistula*, L. or purging Cassia of Alexandria. It is indigenous in Egypt, and both Indies, and bears a cylindrical pod, containing a soft, black pulp, of a sweetish taste, which dissolves, for the most part, both in water and rectified spirit. This pulp is a gentle laxative, and frequently given, in doses of several drams, to persons of costive habits. In inflammatory complaints, it is sometimes administered in much larger doses, from one to two ounces, when acrid purgatives are improper; though it is apt to nauseate the stomach, to produce flatulency, and griping; especially if the pulp be of an inferior kind, or spoiled by long keeping: these effects may, however, be obviated by the addition of aromatics, and by taking it in a liquid form.

[There are several species of Cassia in the United States. Two in particular deserve notice: a. *Cassia Marylandica*, is used as a purgative, and possesses nearly the same virtues as the *senna* of the shops; both plants belong to the same genus.

b. *Cassia Chamæcrista*, is cultivated in Maryland, and on the eastern shore of Virginia, for the purpose of recovering worn-out lands, and of enriching such as are naturally poor. Sandy lands, in particular, are ameliorated by it. It bears the absurd and confusing trivial names of Eastern-shore Bean, Golden Cassia, Peacock Flower, Aquamaque, or Magothay-bay Bean. Mr. BORDLEY asserts, that "this plant, which is *not* the *partridge* pea, is so difficult to eradicate, that it might become an injurious weed in other soils and courses of crops than those in Aquamaque. The courses there being maize and oats, lay on a sandy, loose soil." This plant is particularly described, and an account of its culture, detailed by Dr. GREENAWAY. *Amer. Phil. Trans.* vol. 3.]

2. The *Cassia Senna*. See SENNA.

CASSIA-BARK. See *Laurus Cassia*.

[CASSINE, *South sea tree*, *Native of S. States*, rises to the height of ten or twelve feet, sending out branches from the ground upwards, which form themselves into a sort of pyramid. The flowers are produced in close whorls at the joints of the branches, near the footstalks of the leaves; they are white, and are succeeded by red berries, which continue upon the plant most part of the winter, and being of a bright red colour, make a fine appearance intermixed with green leaves.

Cassine is thought to be one of the most powerful diuretics hitherto discovered. It also vomits severely. It is highly esteemed among the S. Indians, who call it "Youpon." They use the plant in

decoction....Cassine is generally supposed to be the same plant that is called "Paraguay" in South America, where the Jesuits formerly made a great revenue from the leaves, of which an account is given by Mr. FREZIER.]

CASTOR. See BEAVER.

CASTOR-OIL is extracted from the castor nut, or the seed of the *Ricinus communis*, a native of the West Indies. These seeds are about the size of small beans, which, in their brittle shells, contain white kernels, of a sweet, oily, but somewhat nauseous taste. Nor is the expressed oil quite free from the acrimony of the nut; though it is, in general, one of the mildest and safest purgatives; so that half a tea-spoonful for a dose has been given, with success, to new-born infants, for lubricating the first passages, and expelling the *meconium*. It is also one of the best vermifuges, and a most efficacious remedy for the dry belly-ach, and iliac passion, when administered in proper doses, to children and adults; viz. the dose for the former, from one to two tea-spoonfuls; and the latter, a table-spoonful, repeated every two or three hours.

As patients generally have a great aversion to this oil, in its pure state, it may be taken swimming either in a glass of peppermint, or simple water, or in the form of an emulsion, with mucilage, or with the addition of a small quantity of rum. The greatest precaution, however, is necessary with respect to the *quality* of this oil, as there are two modes of preparing it, namely, by decoction and expression: the former is of a brown colour, has a rancid, disagreeable taste and smell, and consequently unfit for internal use; whereas that obtained by expression, is more limpid, rather verging to a green colour, and almost tasteless; but, when spoiled by long keeping, it is likewise an improper medicine.

Externally, castor-oil warmed, and rubbed on the parts affected, has been successfully applied in that painful spasmodic contraction, and rigidity of the muscles, called the *tetanus*; as likewise mixed with opium and camphor, in the form of a liniment, to relieve the most distressing spasms, and particularly the *trismus*, or *locked jaw*; in which cases, however, it possesses no specific action.

[The plant producing this excellent medicine grows very well in Penns. It is said there are two sorts, one with a reddish stalk, another with a light blueish stalk. The plant of this last kind only, is propagated for the oil; the former is supposed to have poisonous qualities. To procure the oil, shell the seeds and boil them in water; as the oil rises, skim it off. When the seeds yield no more to the water, press them wrapped loosely, in a coarse cloth, or hair bag. This oil is sweet, without bad taste or smell, and as clear as olive oil: or bruise the seeds and boil them..... The oil skimmed off is much purer, and may be kept much longer than that obtained by expression, because the water detains the mucilage, which abounds in the expressed oil, and disposes it to spoil sooner. This plant should be cultivated in every garden in this state and south of it. In the warm sands of New-Jersey it would thrive well, if the seeds were put in the ground early in the spring. Every farmer might raise as much castor

oil in one year as would be required by his family during several years: and an experiment is worth making upon half an acre of plants as to the profit of their produce.... The plant is cultivated largely near Lexington, Kentucky, and in New-York. In Georgia, and in the Floridas, it grows to a great size.]

CAT, or *Felis Catus*, L. a genus of animals, comprising twenty-one species, and belonging to the same class as the lion and the tyger..... Though originally a variety of the wild cat, one of the most ferocious brutes, this animal is now domesticated, and bred in Britain, as well as in other parts of Europe, Asia and Africa, of which countries it is a native. The former inhabits hollow trees, especially the oaks of large forests, and in winter retreats to the deserted holes of foxes and badgers. Its skin is an excellent fur, but by no means compensates the damage done by wild cats to game and poultry.

The domestic cat, when suffered to retire to thickets, easily returns to a wild state. Its colour is uncommonly diversified; but the most beautiful varieties are, the reddish Spanish cat, and that of Angora, with long silken hair. A tame cat generally attains the age of about twelve years: the female breeds in the first year; though it grows till eighteen months old; she usually produces from four to six blind kittens, after a gestation of fifty-five days; and carefully conceals them, apprehensive of the unnatural voracity of the male. It is farther remarkable, that the female also has been observed to devour her offspring, when it happened to be deformed, or monstrous.

The flesh of animals, or fish, is the most agreeable food to cats; for they partake of vegetable aliment only from necessity. As they chew with difficulty, frequent drink is indispensably requisite to the preservation of their health.... There are, however, some plants of which they are excessively fond; and when indulged with them, present a variety of whimsical gesticulations: of this nature is the valerian root, and the herb called nep, or cat-mint, the *nepeta cataria*, L. on the contrary, they shun other vegetables as their mortal enemies, for instance, the common rue, or *ruta graveolens*, L. Any substance rubbed with the leaves of this plant, is said to be perfectly secure from their depredations: for the communication of this useful fact, in domestic life, we are indebted to C. P. Funke, a German naturalist.

Cats enjoy a warm temperature, and a soft couch.....moisture and filth, as well as water and cold, are equally repugnant to their nature; hence they are continually cleaning themselves with their paws and tongue. Another peculiarity is, the *purring* of these animals, when they are cajoled, or flattered, by passing the hand over their backs: this singular noise is performed by means of two elastic membranes in the larynx, or the upper part of the wind-pipe..... Their hair is so electric, that the expanded skin of a cat makes an excellent cushion for the glass cylinder, or globe, of an electrifying machine.

The flesh of cats is eaten by several nations, but the substance of the brain is said to be poisonous. From the intestines of these ani-

mals are manufactured the celebrated Roman chords, for covering the violin.

With respect to their peculiarities, we shall remark, that cats possess a very acute sense of both smell and sight; by the structure of their eyes, which sparkle in the dark, they are better enabled to discover objects of prey, such as mice and rats, at night, than in the day time: hence they ought not to be luxuriously fed, if kept for the destruction of those vermin. It is, however, to be regretted, that this useful domestic creature is one of the most deceitful companions..... Constantly bent on theft and rapine, the cat is a compound of cunning and dissimulation, seizes every opportunity of doing mischief, and flies from punishment, when detected. It is, therefore, not a little surprizing, that many elderly ladies are so partial to these quadrupeds, that they will even suffer them to sleep in the same bed; a practice fraught with considerable danger; as the exhalation of cats is extremely detrimental to the lungs; besides which, they are liable to hydrophobia, as well as the more faithful dog. For these reasons, we would advise parents, not to permit their children to play for hours, with these animals, even though the swallowing of cat's hair should not be attended with such bad effects as many are inclined to believe.

Lastly, Whether the marvellous stories concerning the revengeful disposition of cats, be well founded, or otherwise, it cannot be doubted that many judicious persons have so invincible an antipathy against these creatures, that they have been known to faint in rooms where cats were concealed; and that no arguments were sufficient to efface the impression. We are, therefore, decidedly of opinion, that great precaution ought to be used in the treatment of the purring tribe; and instead of provoking them to malice and anger, it will be more prudent to keep them at a due distance.

CAT-SALT, a beautiful granulated species of common salt, thus denominated by the manufacturer. It is made from the bittern, or leach brine, by the following process: When the common salt is drawn out of the boiling pans, it is put into long, wooden troughs, the bottoms of which are perforated, that the brine may drain off. Beneath these troughs, vessels are placed for the reception of the brine, and across them small sticks, to which the cat-salt adheres in large and beautiful crystals.

This salt is very pungent, and, though pellucid when in a mass, becomes white on being reduced to powder: it is sometimes used for culinary purposes, but more frequently employed by the manufacturers of hard soap.

CATAPLASM. See POULTICE.

CATARACT. See GUTTA SERENA.

CATARRH, or COLD, a disease arising generally from a sudden diminution of insensible perspiration, by exposing the body to a damp, or cold air, after having been, for some time, under the influence of a warmer temperature. It is at first attended with an increased secretion of mucus, from the glands and membranes of the nose, eyes, throat, windpipe, &c. hence a defluxion of a thin, acrid humour, which irritates those glands

and membranes, occasions some difficulty of breathing through the nose, with a sense of fulness, and sooner or later, produces all the usual symptoms of a common cold. Contrary to the prevailing opinion, we are convinced that bleeding is seldom, if ever, necessary in these, and similar affections. As, however, catarrhs are sometimes attended with a slight degree of inflammation, and fever, their treatment must be regulated accordingly: but, if unaccompanied with febrile symptoms, there is no danger to be apprehended.... In the latter case, only, we shall suggest a few directions for managing those frequent complaints, which are generally neglected at their commencement.

It was formerly maintained, that *all* colds may be cured by *sudorific* remedies; but experience has proved that this method, though sometimes successful, has often been productive of injury. In modern times, the opposite treatment has been adopted, and both the internal use, and external application of cold water, have been indiscriminately recommended. The true and proper plan, however, appears to be the medium between these extremes; for it cannot be doubted, that keeping the body too warm, and excessive indulgence in hot, diluent drink, predispose it to catarrhs; as, on the other hand, the internal and external use of cold water tends to strengthen the whole animal frame, and renders it less susceptible of the impressions of air and cold. But, unfortunately, the *preservative* means have, in this instance, been confounded with the *curative*, or those intended for effecting the cure.....Hence, in the beginning of every catarrh, the following particulars deserve attention:

1. To dilute and weaken the acrid humour, secreted by the glands: this purpose may be attained by inhaling the steam of water, and drinking proper quantities of warm diluents.

2. To prevent too great a defluxion of humours, or to render the mucus itself milder, and facilitate its excretion, it will be of great advantage to apply vesicatories contiguous to the parts most affected by the cold. (See BLISTER.)

3. To evacuate the concocted, or digested matter: this salutary effect is accomplished either by spontaneous defluxion, or by the pores and urine. Both must be principally intrusted to Nature; as we should assist, and direct, her operations only in the mildest, and most cautious manner.

Dr. MUDGE, in a treatise on this disease, recommends the steam of hot water, as a most efficacious and safe remedy, and which indeed he considers as almost *infallible*. The method of inhaling these steams is very simple; but he observes that, for healthy persons, who may accidentally see his machine, great precaution is necessary, not to make the experiment of respiring through cold water; as thus they would be almost certain of contracting a severe cold. For those troubled with a catarrh, he directs as follows: In the evening, a little before bed-time, the patient, if an adult, is to take three drams, or as many tea-spoonfuls of paregoric elixir, in a glass of water: but, if a child, under five years of age, one tea-spoonful; or, from five to ten years old, two. About three quarters of an hour after, the patient should go to bed, and, being cover-

ed warm, the inhaler three parts filled with water, nearly at the boiling point (which from the coldness of the metal, and the time it ordinarily requires before it is used, will be of a proper temperature), and being wrapped up in a napkin, but so as not to obstruct the valve in the cover, which is to be placed at the arm-pit, and the bed-clothes being drawn up, and over it, close to the throat, the tube is to be applied to the mouth, and the patient should inspire and expire through it, for about twenty minutes, or half an hour.

It is very evident, says Dr. MUDGE, as the whole act of respiration is performed through the machine, that by inspiration the lungs will be filled with air, which will be hot, and loaded with vapour, by passing through the body of water; and in expiration, all that was contained in the lungs will, by mixing with the steam on the surface of the water, be forced through the valve in the cover, and settle on the surface of the body, while under the bed-clothes.

The great use of this particular construction of the inhaler is, 1. As there is no necessity, at the end of every inspiration, to remove the tube from the mouth, in order to expire from the lungs the vapour which had been received into them, this machine, may, therefore, be used with equal facility by children and adults. 2. As febrile symptoms frequently accompany the disorder, the valve, in that respect, is also of the utmost importance: for a sweat, or, at least, a free perspiration, not only relieves the patient from the restless anxiety of a hot, dry, and, sometimes, parched skin, but is of all evacuations, the most eligible for removing the fever: and it will be generally found, that, after the inhaler has been used a few minutes, the warm vapour under the clothes will, by settling upon the trunk, produce a sensible perspiration, which will gradually extend itself to the legs and feet.

In any feverish habit attending this cough, it would be proper to take a draught of warm, thin whey, a few minutes before the inhaler is used; and after the process is over, the sweat which it has occasioned, may be promoted by drinking small draughts of weak, warm whey, or barley-water. The sweating is by no means so essential to the cure of a catarrhous cough, as that the success of the inhaler at all depends upon it; yet the Doctor observes, that its advantages are very important, when the disease is accompanied by febrile symptoms.

After this respiratory process is performed, the patient generally passes the night without the least interruption by the cough, and feels no farther attack than, perhaps, once, or twice, in the following morning, to throw off the trifling leakage, which, unperceived, had falled into the bronchiæ and vesicles, during the night; the thinner parts of which, being evacuated, the remainder is easily expectorated.

However, continues Dr. MUDGE, if the patient hopes not to be disappointed in the success of this process, it is essentially necessary that he strictly attend to the following rules:

1. As valetudinarians are but too well acquainted with the first symptoms of this disorder, the remedy must be used the same evening; which will, in an ordinary attack, be attended with an

~~nary attack, be attended with an~~ immediate cure: but, if the soreness of the respiratory organs, or the petulance of the cough, indicate the severity of the cold, the inhaler, without the opiate, should be repeated the next morning.

2. If the use of this apparatus, &c. be delayed till the second night, it will be always proper to repeat the process the following morning, without the opiate, except where the attack has been violent.

3. Should the cough be neglected for some days, it will always be necessary to employ both parts of the process at night, and the succeeding morning, as the first simple inflammatory mischief is now most probably aggravated by an additional disease, of a chronic nature. But if this should be omitted, and the cough continue to harass the patient, it is of the utmost consequence, particularly in delicate and tender individuals, to attempt the removal of it as soon as possible, before any floating acrimony in the constitution (from the perpetual irritation) receives an habitual determination to an organ so essential to life as the lungs.

If the patient, with ease and freedom, expectorates a thick, and well digested, inoffensive phlegm, there is generally but little doubt of his throwing off the disorder, with common care, in a few days: and till that be accomplished, a proper dose of paregoric elixir, for a few successive nights, will be found very useful, in suppressing the fatiguing irritation, and ineffectual cough, occasioned by a matter which in the early stage of the disease, flows into the bronchiæ, during the night, and is generally too thin to be discharged by those convulsive efforts. But should the cough still continue, notwithstanding a *free* and *copious* expectoration, and the discharge, instead of removing the complaint become a disease greater than the constitution can support, it is possible that a tender patient, possessed of weak and relaxed lungs, may do himself irreparable injury without the least appearance of purulence, or any suspicion of suppuration. In those cases, besides increasing the general perspiration, by the salutary friction of a flannel waistcoat, change of situation, especially long journies on horseback, conducted as much as possible, through a thin, sharp, dry air, will seldom fail to remove the complaint. On the contrary, if the cough should continue dry, husky, without expectoration, and fatiguing to the breast, provided there be no apprehension of tubercles, either forming or already formed, there is not, perhaps, a more efficacious remedy for it than half a drachm of gum ammoniac, with eighteen or twenty drops of liquid laudanum, made into pills, taken at bed-time, and occasionally repeated. This excellent remedy was recommended by Sir JOHN PRINGLE, and Dr. MUDGE, observes, that he has, in many instances, found it to be very successful, and generally expeditious; for it almost uniformly produced an expectoration, and abated the distressing fatigue of the cough...... The latter practitioner has, likewise, in many instances, known a salutary revulsion made from the lungs, by the simple application of a large plaster, about five or six inches in diameter, of burgundy pitch, between the shoulders; as

the perspirable matter which is pent up under it, becomes so sharp and acrid, that it generally produces, in a few days, a very considerable itching, some little tendency to inflammation, and frequently a great number of boils. This application should be continued (the plaster being occasionally changed), for three weeks, a month, or longer, if necessary.

Although seemingly a trifling precaution, yet it is by no means a useless one to the patient, not to expose his shoulders to the cold air, while in bed, during the night; but to take care that they be kept warm, by drawing the bed-clothes up to his neck, when he reposes.

If, notwithstanding these, and other means, the cough should continue dry, or be unattended with a proper expectoration, and together with a soreness, produce shooting pains through the breast, and between the shoulders, accompanied with difficulty of breathing, flushes of the cheeks after meals, a burning sensation in the hands and feet, and other symptoms of a hectic fever, no time must be lost, as there is the greatest reason to appprehend, that some acrimony in the habit is determined to the tender substance of the lungs, and that consequently tubercular suppurations will follow. In this critical and dangerous situation, the Doctor observes, from long experience, that the patient will derive the greatest benefit from a change of air, and by strictly adhering to a diet, consisting of asses' milk and vegetables....His advice concerning large bleedings, appears to us liable to many objections.

CATCH-WEED, the TRAILING, or German Madwort, *Asperugo procumbens*, L. an indigenous plant, growing near roads and amongst rubbish. Its angular stem bears blue, or purple flowers, in April and May.

Sheep are exceedingly fond of this weed; and its tender leaves may be dressed and eaten as an excellent culinary vegetable.

There is another plant to which Dr. WITHERING gives the name of CATCHWEED, namely, the *Galium Aparine*, L. but which is more generally denominated Cleaver's GOOSEGRASS: hence we propose to treat of it under that article.

CATECHU, or *Mimosa Catechu*, L. or sensitive plant, which is a native of the East Indies, and comprises above sixty species..... From this plant is produced the extract denominated catechu, which was for a long time erroneously called *Terra Japonica*, from the earthy particles it contains; but which are entirely adventitious, and consist of impurities adhering to it, while in the furnaces or kilns, in which it is usually prepared.

The extract of Catechu, when in its purest state, is a dry substance, which may be reduced to powder, and almost entirely dissolved in water, or in spirits of wine. It is a mild, but excellent astringent, and leaves in the mouth an agreeable sweetness....This medicine is more particularly useful in alvine fluxes; and where, on this account, astringents become necessary, it is perhaps the most salutary. It is also successfully employed in complaints peculiar to females, laxity and debility of the viscera, in general, and in various other diseases, which require strengthening remedies.

When dissolved in the mouth, the catechu has frequently afforded relief for weak and ulcerated gums, for aphthous eruptions, or the thrush, and similar affections.

The best form in which catechu can be taken, is that of simple infusion in warm water, with the addition of cinnamon, or cassia: thus it is freed from its impurities, and rendered more palatable. It is given in doses from fifteen to forty grains, according to the age and constitution of the patient.

CATERPILLAR, or *Eruca*, a genus of insects, comprehending many species, of which that most generally known is the common, or garden-caterpillar. The natural food of these creatures consists of the leaves and verdure of vegetables; but, harmless as they appear, there are some species among them which destroy one another, whenever an opportunity offers: the generality of caterpillars, however are very peaceable, and many species live together in the same place, without molesting each other. These would breed and multiply to an incredible degree, were they not devoured by other insects, which prey upon them, both externally and internally, and literally consume them alive.

Caterpillars are very destructive in gardens and fields, especially those denominated the black, and the black-canker caterpillar, which prey principally on turnips. The former insect is of the colour of soot; and, when full grown, about three quarters of an inch in length. It commences its depredations towards the end of August, or the beginning of September, and is particularly numerous, when the north or easterly winds prevail. To counteract the devastation occasioned by this insect, it has been recommended at the first ploughing, to irrigate the furrows with lime-water, which will effectually destroy it; as few insects like the smell of any thing that has been burned.

The black-canker caterpillars are principally found in the county of Norfolk, where, from the great number of insects which have been washed upon the beach, by the tide, it is generally believed that they are not natives, but wafted across the ocean. These cankers are supposed to be the caterpillar state of the yellow fly, which is particularly destructive in fields planted with turnips and cabbages; for they have been observed regularly to assume the appearance of those flies. For this evil, there appears to be no other remedy, but to pull the creatures off their nests, and to watch the flies, which during the hot weather are daily depositing their eggs on those plants.

There is also another variety, called by gardeners the *grub*, the skin of which is very tough, and of a brown colour. This insect is particularly injurious, usually depositing its eggs in the very heart of the plants, through all the blades of which it eats its way, leaving behind a great quantity of its excrement, which is hurtful to vegetation. Grubs likewise burrow under the surface of the ground, and do great damage to young plants, by eating off their tender stalks, and drawing them into subterraneous holes. This mischief is principally done in the night; but if the earth be stirred about an inch deep, where a plant is found to be thus injured, the insect will be disco-

vered: and this is the only certain way of exterminating these noxious vermin.

When caterpillars attack fruit-trees, the most efficacious way to destroy them is the following:.... Make a strong decoction of equal quantities of rue, wormwood, and common tobacco, and sprinkle this liquor on the leaves and young branches every night and morning, while the fruit is ripening.

Various other experiments have been made with a view to extirpate these mischievous vermin. We shall, however, mention only the following methods which have been attended with peculiar success: Take three quarts of water, and one quart of vinegar; let them be heated till they nearly boil; then put one pound or more of pure soot into the mixture, and stir it with a whisk till the whole is duly incorporated. Sprinkle the plants with this preparation every morning and evening: in a few days all the caterpillars will disappear..... This has also been effected by sprinkling plants (and more especially gooseberry-bushes, which are remarkably subject to the depredations of these insects) with a preparation consisting of one quart of tobacco-liquor, in which an ounce of alum has been dissolved. As soon as the plants or bushes appear to be in the least degree corroded, or any eggs are observed on the leaves, a brush should be dipped into the liquor, whch, by drawing the hand gently over its hairs, is carefully sprinkled on them. If any eggs be there deposited, they never come forward after this application; and if those eggs have already been changed into worms, they either die, or sicken, so as to fall off the bush; in which case they may be easily killed.

When the trunk and boughs of trees abound with the eggs of caterpillars, especially in the early spring, it is advisable to rub the bark of all the affected places with a sponge dipped in soap-water; and, where the height of the tree renders it necessary, this operation may be facilitated, by fastening pieces of flannel to a lath or pole, after soaking them in a similar liquor.

[The following excellent observations upon the means of preventing the effects of caterpillars on fruit trees are by W. Hampson, Esq.

Some time ago, having an intention to improve a number of apple-trees, which, owing to their being yearly infested with the caterpillar, had been long neglected, I began in the following manner. It being early in the spring, I first caused the thick brown moss to be removed from the trunk of the tree, around which, but at a distance equal to the extremities of the roots, I spread warm rotten litter; and then, with the back of a pruning-knife, scraped off the livid-coloured moss with which the branches of the tree were entirely encrusted. But what surprised me, and to what I would beg particular attention, was, that small detached pieces of moss hung upon the bough by fine threads after it had been cleaned: this led me to think they belonged to some eggs or insects which lay concealed between the moss and the outer bark, or between the outer and the inner rind: but being then without the help of glasses, my curiosity remained unsatisfied, although the effects dis-

covered in the opening season justified my strongest apprehensions; for those trees which had been thoroughly cleaned, put forth strong and healthy shoots, and retained their leaves; when others, their neighbours, were eaten up; yet what convinced me beyond the least doubt was, a tree which through negligence had been left in part cleaned; the boughs which I had cleaned were untouched by the caterpillar; on the contrary, the leaves of those boughs I had not cleaned were soon consumed by them.

These facts being stated, the following remarks are naturally suggested: First, that the eggs of the caterpillars lie, during the winter, concealed in such trees as are overgrown with moss, between the moss and the rind, or, where the rind is decayed, in the cavities occasioned by such decay; a circumstance which, with the assistance of a microscope, I have since ascertained: but through mere neglect, having not preserved the eggs for future observation, I cannot say, determinately, they were the eggs of the caterpillar; but this I can say, that the removal of those eggs prevented the leaves of the tree from being eaten. Secondly, that the proper time for destroying them would be before the eggs are hatched; for, by the time the caterpillar is come out, the buds begin to open, and of course become its immediate prey; and as the butterfly tribe are so numerous and so perfectly free from restraint, the nature of the case will require an annual search to be made in such places as are thought favourable to them for depositing their eggs: there will be often found full-grown trees, which by being encumbered with branches, the power of the sun is not admitted to shrivel the old rind as the new one is forming; consequently such trees become encrusted with decayed coats, the fit receptacles for preserving the embryo caterpillars; and such trees whose wounds have been suffered to heal, so as to form an hollow, retaining moisture, which cankers the wood, and renders it easily perforated by the fly, are likewise liable to become a prey to the insects they have preserved. See GOOSEBERRY]

About the middle of the last century, experiments were made to manufacture *paper* from the cods which caterpillars spin, and in which they undergo their transformations from a worm to a nymph, or chrysalis, and thence to a butterfly.... These cods, after being cleared of the leaves that adhered to them, and well beaten, were reduced to a kind of pulp, which when spread in water, was collected into the form and made into sheets of paper of a coarse brown colour; but as some of them were much whiter than others, it was supposed, that by being beaten and washed a longer time in the mortar of the mill, they would acquire a greater degree of whiteness. At the present period, when the materials for manufacturing paper are exceedingly scarce, we would recommend a repetition of this experiment; for, if the result should be successful, considerable advantage may be derived from the cods of those insects, which occasion often irreparable damage to the industrious cultivator......See also, INSECT.

WATER-CATERPILLARS, *Erucæ aquaticæ*, L. are thus called from their living under water. They

feed on aquatic plants, and respire by their stigmata in the same manner as the common caterpillars of the garden.

There are, according to REAUMUR, two varieties of these insects, the one on the *Potamogeton*, or pondweed; the other upon the *Lenticula*, or duck-meat: the first of these is the larger; and as its operations are more easily distinguished, it is better known than the other. Though strictly an aquatic animal, it does not delight in the water, and is extremely solicitous to avoid wetting itself. It is produced in the same manner as the land-caterpillar, from an egg which the parent butterfly deposits on the leaf of a certain plant, out of which the insect, as soon as it is hatched, gnaws a piece of a circular form. This it carries to another part of the same leaf, and places it so as to construct a cavity in which it may safely lodge. It then fastens down the piece to the larger leaf, by silk of its own spinning, leaving holes at certain distances, through which it may push its head, and prey upon the adjoining leaves: these are naturally so smooth, that they are seldom wetted; and, as often as its habitation becomes too small, the insect makes others successively, each being adapted to its periodical size, till it undergoes the usual changes into a butterfly. In this state, as soon as its wings are dry, it leaves the water, never to return again.

WOOD-CATERPILLARS, *Erucæ sylvestres*, are thus denominated, because they live, contrary to the generality of caterpillars, under the bark, in the trunk, branches, and roots of trees, and sometimes in the body of the fruit. They are produced from eggs deposited on the surface; and eat their way farther, as soon as they are hatched.

Some of these caterpillars leave their abode in order to change into their chrysalis, and thence into their butterfly state; but most of them remain there, and pass through all their changes. These insects would increase to an immense number, were they not destroyed in a similar manner with the common caterpillars, by a species of worms, that insinuate themselves into the fruit or tree inhabited by the former, which successively become their prey.

Various experiments have been tried to extirpate these pernicious vermin; but none has been attended with more success than that of lighting small fires near trees, about sun-set, into which they will eagerly fly; and thus, by burning their wings, meet with inevitable destruction.

CATHARTICS. See PURGATIVES.

CATMINT, or NEP, the *Nepeta Cataria*, L. a native plant growing on pastures and hedges, in a calcareous soil....near Bungay, Suffolk; Wick Clifts; on the beach at Rampside; Low Furness; Dudley Castle, &c. Its stalk is a yard high, and branched; the leaves are of a velvet-like softness; the blossoms white, with a tinge of red, spotted with purple, and appear in July.

This is a hardy plant, and easily propagated by seeds; it has a bitter taste, and strong smell, resembling a mixture of mint and penny-royal. An infusion of the catmint is recommended as a good cephalic, and deemed a specific in chlorotic cases: two ounces of the expressed juice are usually given for a dose. Cats are exceedingly fond of it, especially when it is withered. Mr. RAY mentions, that

he had transplanted the common catmint from the fields into his garden; but the cats soon destroyed it: those plants, however, which came up from the seeds, uniformly escaped; and thus he found the old proverb verified, namely, "If you set it, the cats will eat it; if you sow it, the cats will not know it."..... The plant is eaten by sheep, but refused by cows, horses, goats, and swine.

[A watery infusion of the leaves and stalks of this plant, is a common and successful domestic remedy in Pennsylvania for promoting perspiration, when the body is affected by flying pains after exposure to cold.]

CATS-MILK. See WART-WORT.

CATS TAIL, or REED-MACE, the *Typha*, L. a genus of native plants consisting of two species: 1. The *latifolia*, or great cats tail, bearing a stalk from six to eight feet high, leaves a yard long, and somewhat sword-shaped, cylindrical catkins, and no blossoms; it grows on the banks of rivers, fish-ponds, and in marshes; 2. The *angustifolia*, or small cats tail, with semi-cylindrical leaves below, where sheathing the stem; but flat and strap-shaped towards the end; it also grows in ditches and ponds, and is frequently met with in the clay-pits of Norfolk and Suffolk. There is, according to LINNÆUS, a variety of the second species growing among rocks, where its roots are confined; so that it becomes smaller, but its spikes are more numerous. Specimens of it have been found on Hounslow-heath.

The cats tail is one of those neglected plants which might be easily applied to various useful purposes. At present, its leaves only are employed, partly by coopers for calking the bottom of casks, and partly by the manufacturers of rush-bottomed chairs. In Russia, the woolly down surrounding the seed, is mixed with the feathers of quails, and used for stuffing bolsters. But the Germans have lately made successful attempts towards converting the downy catkins of this plant into a more valuable article of commerce. In 1789, M. WEICHHAN, an ingenious hatter of Ostritz, in Lower Lusatia, transmitted to the *Economical Society of Leipzig*, an excellent *hat*, manufactured of one part of this vegetable substance, and two parts of hare's fur. He assured the Society, that the mixture not only worked admirably well under the bow, but likewise formed a complete union when felted. A proportionate addition of Spanish wool, would probably afford a still better material, and produce hats sufficiently fine and elastic.

Professor FORSTER, of Halle, in the year 1790, sent to the Society above-mentioned, a specimen of blotting *paper* made of a mixture, consisting partly of the villous hair of the cats tail, and partly of the coarsest linen and woollen rags employed for that purpose; but Dr. BOHMER, whose botanical work we have frequently quoted, asserts, that a good writing paper has been manufactured of the dry down obtained from those catkins, after they had been, in a manner, parched by the heat of the sun; and that such paper was peculiarly fit for drawings and paintings.

CATTLE are those quadrupeds, which serve either for tilling the ground, or as food for man. They are divided into *black cattle*, which comprise horses, oxen, bulls, cows,

and their young; and into *small cattle*, that is, rams, ewes, lambs, goats, &c.

Having incidentally treated on some of the animals that are classed under this denomination, we shall confine our present account to the management of cattle in general; pointing out such vegetables, as may be given them with advantage, together with a few supplementary rules, to be observed in the breeding of these useful animals, and some observations on the most common distempers to which they are peculiarly liable.

I. WITH RESPECT TO FOOD.

The first object in the article of food, is wholesomeness: wild cattle feed entirely on the green vegetables, which they find throughout the year. Similar nutriment should therefore, if possible, be procured for tame cattle, in all seasons; but such food can be found only among those plants, which are either constantly green, or arrive at maturity in the winter. Of all vegetable productions, the most exuberant, for this purpose, appears to be the cabbage, with its numerous varieties, of which we have already spoken: the disagreeable taste, which that plant is supposed to impart to milk, can be no reasonable objection to its use; as it may be obviated by boiling, or, still more effectually, by preparing it in certain vessels, of which we shall give a description, with a cut, under the head of ROOT-STEAMER.

Turnips and carrots constitute the next article, and cannot be too forcibly recommended, especially as a winter food. So very great is the produce of the latter plant, that, according to the account of Mr. ARTHUR YOUNG, twenty work-horses, four bullocks, and six milch cows, were fed at Parlington, in Yorkshire, England, for above five months, with carrots, the produce of three acres; nor did they, during that period, taste any other food, except a little hay. The milk, he farther adds, was excellent, and the refuse fattened thirty hogs, with very little additional food.

[Almost every English book on farming extols the great benefit derived from feeding cattle during winter on turnips. In the United States the practice is not adopted of choice, and where an experiment has been made of this food, a favourable opinion of it has not been the consequence. A judicious friend, W. R. who successfully follows grazing, lately had an abundant crop of turnips, which he could not dispose of; he therefore determined to feed his cattle upon them. The beasts were put up in October, and were fed until February upon turnips. They did not thrive as he expected, on the contrary, they rather lost flesh; but on changing the food to hay, Indian corn meal, and chopped potatoes, they soon fattened....Whence is the cause of this different result in Europe and the U. S.?]

Potatoes furnish a supply, equally excellent and wholesome. Horses are particularly fond of them. To these may be added, the plant, called whins, the utility of which has but lately become generally known. They require, it is true, to be ground in a mill, before they are given to cattle, and do not materially ameliorate the ground, a circumstance considered as an objection to their culture; but, notwithstanding these apparent disadvantages, they produce

an excellent and invigorating fodder, and constitute one of the cheapest articles of winter provision; as they continue green during the whole year, and will grow on the most indifferent soils.

Burnet, white beet, the *Mangel Wurzel*, or root of scarcity, having been already mentioned, it is unnecessary again to point out their utility in feeding cattle.

There is another branch of the vegetable creation, usually denominated *grasses*, which contain a variety of species that are particularly useful for this purpose, such as the *Festuca ovina*, or sheep's fescue; the *Festuca rubra*, creeping, or purple fescue; and the *Holcus lanatus*, meadow soft-grass; the physical properties of which, we shall notice hereafter. To this number belongs likewise the *Astragalus glycyphillos*, sweet milk-vetch, or wild liquorice-vetch, or milk-wort, as it is differently called; which, independently of its utility in affording a wholesome and nutritious winter-fodder, deserves every attention from the cultivator, as it will flourish luxuriantly on the most barren soil.....The *Lathyrus Aphaca* and *pratensis*, yellow vetchling, and everlasting tare; several species of trefoil and clover; the purple, or everlasting bush vetch, and the everlasting pea, all are most excellent fodder for cattle..... Fir-tops, that is, the tender shoots of firs, though not generally known, also constitute an useful substitute. A remarkable instance of this fact occurs in the fifth volume of the *Bath Society* Papers, where an ingenious correspondent mentions, that, being greatly in want of provender, having very little, or no hay, he was obliged to feed his cattle on fir-tops. And, though he had upwards of 400 head of horned cattle, yet he did not lose above four or five; while many farmers and graziers, who lived in the same county, lost one-half, and several of them almost their whole stock. Hence we seriously recommend farther trials to be made with this article, which, in our opinion, promises a wholesome and invigorating food, and might, in a short time, be procured without employing large quantities of land for the growing of winter provision.

The last vegetable that peculiarly merits attention, as affording a proper food for cattle, is the *Trifolium Melilotus officinalis*, L. common melilot, which frequently calls forth all the patience of the industrious cultivator; but which, from being a noxious weed, may become an inestimable resource. This plant has been given, both in a green and dry state, to horses, bullocks, asses, goats, and sheep, all of which have eaten it eagerly; it has also been allowed to pigs, which, however, relished it only while green. Let it suffice to observe, for the present, that, as the melilot grows on the worst soils, where it spreads like a shrub, and rises to the height of from three to five feet, great advantages may be obtained by planting it in desolate and barren places.

In enumerating the various vegetables, which appear to be the most beneficial food for cattle, we have necessarily avoided entering into any particular details concerning their culture; because some of them have already been, and the rest will be, hereafter noticed in their alphabetical series.....Two articles have lately been employed with considerable success in fatten-

ing of cattle. The first is *wash*, or the refuse of grains remaining after distillation: this liquor is conveyed from the distillery in large carts, closely jointed and well covered, so as to prevent leaking. It is then discharged into vats or other vessels, and when these are about two-thirds full, a quantity of sweet hay, previously cut small, is immersed for two or three days, in order that the wash may imbibe the flavour of the hay, before it is used. In this state, the mixture is carried to the stalls, and poured into troughs, from which it is eagerly eaten by cattle. Some animals, however, shew at first an aversion to such food; in which case their hay should be frequently sprinkled with the wash; so that, by having the smell constantly before them, and seeing others eat with avidity the same preparation, it gradually becomes less nauseous, and is at length much relished.....The cows and oxen thus fed, not only repay the expence of their keeping, by fattening speedily, but yield a large quantity of rich manure, which is more valuable than that from any other food.

An equally successful method of fattening cattle in general, and oxen in particular, consists in giving from half to a whole pint of molasses, twice in the day, to every *starving* animal, that has been exhausted by continual and severe labour, for a series of years. For this purpose, a gallon of oats, or any other damaged grain, roughly ground, or the same proportion of potatoes, should be boiled in a sufficient quantity of water, to form a thick mash. It must be well stirred while on the fire, to prevent its burning, or adhering to the sides of the vessel; and, when it becomes cool, the mixture is formed into balls, each weighing about a pound. One half of these balls, after dipping them into the molasses in the morning (the remainder in the evening), is given to the cattle, which devour them with great eagerness, and speedily grow fat, by the addition of a little hay, or any green fodder that is not too succulent. Besides, one or two spoonfuls of salt are generally dissolved in the composition, which contributes to preserve the health of the animals; and in case ground corn cannot be procured, oil-cake, diluted with water, seasoned with a little salt, and moistened with the same quantity of molasses, may be advantageously substituted.

II. The breeding of cattle.

The English cattle are divided into several classes, or breeds, denominated from the different counties in which they are reared; as the Lincolnshire and Holderness, which are distinguished for their size; the Welsh and Norfolk breeds, which are as remarkable for their lean and wretched appearance, as the Lancashire and Herefordshire are for their beautiful and healthy look. Besides these, there are several others, as the Sussex, Devonshire, or Somersetshire, which, though fine cattle, do not attract that attention which is generally, and deservedly, paid to the Lancashire and Herefordshire breeds. The former of these is particularly celebrated for the improvements made by the late ingenious Mr. Bakewell, of whose mode of breeding we have already given a concise account.

There was a remarkable peculiarity in Mr. Bakewell's cattle; namely, their uncommon docility and meekness, which were so great, that a boy with a switch could, without any difficulty, con-

duct them from one part of his farm to another. This gentleness was the effect of management, and evinces the superiority of his mode of breeding. While we admire and acknowledge its excellence, we cannot but advert to the mischief which is frequently done by horned cattle, and doubtless arises from very contrary practices. Such injurious consequences, however, might be prevented by *tipping*, that is, by sawing off the points of the horns of cows, bulls, and oxen, and fixing on them small knobs of wood, about three inches in diameter; then boring a hole through the horn and wood, and clinching a nail on the opposite side. Although, by this precaution, the horns are in a manner despoiled of their beauty, yet, when compared with the advantages resulting from it, this trifling loss cannot be regretted.

Concerning that fatal disorder, the *rot in sheep*, Mr. BAKEWELL was particularly attentive to its origin and progress: he found, from experience, that it was generated solely by floods. When, therefore, particular parcels of his best breed were past service, he fattened them for the butcher; and to be certain that they would be killed, and not go into other hands, he used "*to rot them*" before they were sold. This singular practice appears to have been the offspring of jealousy: it was effected by overflowing a pasture, or meadow, in summer; as the soil thus inundated inevitably rots all the sheep that feed on it the succeeding autumn. ....[See SHEEP.]

In the breeding of *stallions* for obtaining cart-horses, Mr. BAKEWELL was also particularly successful; by observing the same rules of proportion as we have mentioned under the article "BLACK CATTLE; and making them in like manner docile and gentle. His economical plan of feeding the latter with turnips, cannot be sufficiently recommended to every industrious breeder. All these roots were carted to the stalls, by which *one* acre went as far as *three*. With respect to the saving of straw, he observed similar care; for, by giving it to his lean beasts in small quantities, he preserved their appetite sufficiently keen to make them eat clean, and thus prevented an unnecessary waste for litter, which is but too prevalent among agriculturists. Nor was his hay consumed in a careless and extravagant manner; the same economical management that was conspicuous in other departments of his agricultural concerns, also prevailed here; and the measures he pursued, to ensure as large a quantity as possible at all seasons, display an ingenuity and spirit of husbandry that rarely occur. This great object was effected by watering his meadows (which were situated near a small brook), by means of cuts that intersect them, and convey water to those parts which are at a distance from the brook; and by making others for carrying off the water, after it had flowed the land. These various works, which were completed at a considerable expence, notwithstanding the disdain and censure of his neighbours, enabled Mr. BAKEWELL to float from sixty to eighty acres of land at pleasure; and he found his labours crowned with the most ample success; as no other annual manuring was required. Instead of thistles, ridges, furrows, holes, hills, &c. that are a disgrace to any farmer, those charming meadows present fine level crops of hay, and beautiful ver-

dure, reflecting the highest credit on his character, as an enlightened and public-spirited agriculturist.

The Herefordshire breed abovementioned, appear to be a mixture of the Welsh, and a spurious race of long-horned cattle. Mr. CAMPBELL, of Charlton, in Kent, however, is of opinion, that the true Herefordshire cattle, with respect to kindly disposition for feeding, or delicacy of flesh, is not more than equal to the true-bred Sussex; though the former are more complete in their make, generally wider and fuller over the shoulders or fore chine, and the breast or brisket, also in the after-part of the rump, which is much oftener narrow and shelly in the latter. In short, the cattle of Herefordshire are, in the opinion of the most experienced farmers, considered as the best in England for *oxen*, the *dairy*, and for *fattening*.

Besides the rules we have already stated, under the head of BREEDING, we shall in this place observe, that cattle may be much improved by *crossing the strain*, or breed; which is said to be attended with the most beneficial consequences. This practice, though ridiculed by some prejudiced farmers, is nevertheless sanctioned by the opinion and long experience of many successful breeders; and especially the late Mr. BAKEWELL; who has recommended the propagating from the old breed, only, till a better could be procured.

In keeping live-stock on grain, as well as grass-farms, their kinds, size, and number, in proportion to the means of subsistence, deserve unremitted attention; as likewise the modes of keeping them, and saving their manure. It is asserted, that English cows require, in general, from one to two acres of pasture: this is mostly *made*, by sowing grass-seeds after the ground has produced crops for many years, being both ameliorated and exhausted under manurings and good tillage. Such land continues several years afterwards in grass, which is carefully cleared of brambles and strong weeds. During this time, the cows drop their dung, which is exposed on the ground, to be exhausted by the united effects of the sun and wind; and which, according to the old system, is supposed to benefit the soil in a considerable degree. But the good effects of this irregular method of fertilizing our pastures is, in a great measure, counteracted by the continual treading of the cattle; and we have every reason to hope that such wasteful and unprofitable modes of manuring will sooner or later be relinquished, and better practices be generally adopted....See IRRIGATION.

These inconveniencies may, however, be obviated, and the cattle supported at less expence, by *soiling* them, a practice, now becoming general in [England,] and which cannot be too strongly recommended. By this means, very few or no division-fences are required: insted of $1\frac{1}{3}$ of an acre, [the usual proportion to one head] one-fourth part will suffice for the subsistence of a beast during the six warmer months; the whole of their manure is well preserved, and given to the soil, where it is most wanted, and in the best condition; the land is not trodden in, and the cattle always ready for immediate use. They are also kept more cool, are less tormented by flies than if pastured, acquire good coats, and full flesh; though they

consume a much smaller quantity of food. Many persons, however, may object to the laying aside of division-fences, that bad seasons will happen, when no grass can be cut and carried in, on account of heavy rains, or cold winds, which retard its growth; and, consequently, that it will be requisite to have some fields divided off, in which the cattle may find pasturage. To these it may be answered, that it will always be found a more safe and profitable plan to keep a quantity of hay in store, to meet the contingencies of unfavourable seasons, and to feed beasts in the manner practised in towns, where they frequently are kept on hay and straw, during the whole year, and thrive exceedingly well.

[*Hard or light stocking of pasture ground*....Some persons contend that the pastures ought to be stocked very lightly; alledging, that although much of the produce is thus allowed to run to seed, which the beasts will not eat, and which of course is trodden underfoot, and rotted by rain and thus wasted; yet experience they say, proves, that a greater profit will be thus derived from it, upon the whole, than by any other practice, on account of the superior thriving of the animals.

Others pretend on the contrary, that light stocking of grass land is a practice highly to be condemned; as it tends not only gradually to diminish its produce, but also to encourage the growth of coarse and unprofitable grasses, which greatly deteriorate the pastures; and that hard stocking of grass lands, especially those of a rich quality, is an indispensible requisite of good management.

These two opinions so diametrically opposite to each other, and which are equally maintained by sensible men, clearly proves the embarrassment to which they are subjected, in consequence of not having adverted to the circumstances stated above, and many other particulars that require still to be developed, as affecting the economical consumption of the produce of grass-lands.

A third party, who approach perhaps nearer to the truth than either of the above, advise, that mixed stock should be always kept upon the same field: and were the consumption of the foul grass produced by the dung of the animals, the only article to be adverted to, it might be, doubtless, so managed as to correct this evil: but there are so many other circumstances to be adverted to, that it is not easy, by this means, to get them all remedied.

In every field, a variety of plants spontaneously spring up, some of which are disrelished by one class of animals, while they are eaten by some others; and some of which plants, though eaten readily by some animals at a particular period of their growth, are rejected by them entirely at another age. Thus it becomes necessary, not only to have a vast variety of animals in the same pasture; but also a very particular attention is required to augment or to diminish the proportion of some of these classes of animals, at particular seasons of the year, otherwise some part of the produce will be allowed to run to waste, unless it be hard stocked to such a degree as to retard their thriving.

But if a great variety of animals be allowed to go at large in the same pasture, they are never suffered to feed with that tranquillity which is necessary to insure thriv-

ing in the highest degree. One class of these wishes to feed, or to play, while the others would incline to rest. They thus mutually disturb and tease each other: and this inconvenience is greatly augmented, if penning of any sort be attempted. From these considerations, the practice of intermixing various kinds of stock very much together, is found to be productive of evils, in many cases, greater than those which result from the waste of food this practice was intended to prevent. And though there is no doubt that by hard stocking the grass will be kept shorter, and consequently will be more palatable in general to the animals which eat it, than if it were allowed to run to a great length, and that thus even unpleasing patches may be consumed; yet as animals, which are to be fattened, must have not only sweet food, but an abundant bite at all times, to bring them forward in a kindly manner, it seems to be nearly impossible to obtain both these advantages together in the practice of pasturage.

Many arguments tend to show that the practice of *soiling*, would be, in general, highly economical. This subject may be considered under the following points of view:

First.....The greater or less variety of plants that would thus be consumed,and consequently prevented from running to waste.

Second.....Whether stall feeding or grazing tend most to promote the health and comfort of the animal?

Third.....The proportional quantity of manure obtained by the one or the other practice.

Fourth.....The quantity of herbage that will be afforded from the same field, under the cutting or grazing system.

Under head *the first*. If the consumption of the plants be the object principally attended to, it is plain the benefits will be great: for experience has clearly proved, that there are many plants greedily consumed by beasts, if cut and given to them in the house, which never would be touched by them when growing in the field. Of this nature is the *dock*, *cow-parsley*, (*chaerophillum sylvestre*), *thistles*, *nettles*, and many other plants. Upon what principle it should happen that these plants should be so readily eat, when thus given, while they are totally rejected when in the field, I cannot say: but that they are thus eaten, without reluctance, even when the animal is not hurtfully hungry, is evident from this circumstance, that the beasts often fall greedily to these at the moment they are brought in from the field, even before they have had time to become hungry after they had come in. Thus fewer plants will be rejected or suffered to go to waste.

In *the second* place. It is well known that many of even the best kinds of grasses, which, when young, form the most palatable food for these creatures, if once suffered to get into ear, are disrelished so much as never to be tasted by them, unless to prevent starvation; and as in most pasture fields, many of these grasses get into ear from various causes, all the produce of these plants is inevitably lost to the farmer. But if cut down by the scythe in proper time, not one of these is ever suffered to get into that nauseating state; and consequently no waste is sustained from this cause.

Thirdly.....When animals are suffered to go upon the field, many of the plants are trodden under

foot by the beasts, and bruised, or in part bruised in the earth; in which state they are greatly disrelished by animals, and are suffered to run to waste; which never could take place, were the practice of cutting adopted. And,

Lastly, on this head. Those few plants which are totally disrelished by one class of animals, so as to be rejected by them even in the house, will not from this circumstance, becomes less acceptable to others, but much the reverse. Food that an animal has breathed upon for any considerable time, becomes unpleasant to other animals of the same class; but not so to those of another species: it seems indeed thus to acquire for them a higher relish. Even greater defilement by one animal, seems to render food more acceptable to others: for straw, that in its clean state has been rejected by cattle, if employed as litter for horses, acquires a relish for cattle that they search for with avidity. Hence it happens that the sweepings of the stalls from one animal, furnishes a dainty repast for those of another kind: which can easily be shifted from one to the other, if the plants are consumed in the house, but which must have been lost in the field. We shall soon have occasion to show that this peculiarity may be employed to answer another useful purpose.

Under head the *second*. If *the health and the comfort of the animal* be chiefly adverted to, the balance will be clearly in favour of the cutting system, when compared with that of pasturing. It is well known that when animals are exposed to the sun, in the open air, they are not only greatly incommoded on many occasions by the heat, but also are annoyed by swarms of flies, gnats and hornets, as well as the terrible gad-fly, which drives them into a state of perturbation little short of furiosity, which must obviously tend to retard their thriving. At other times they are hurt by chilling blasts, or drenched by cheerless rains, which renders their situation very unpleasing, and greatly retards their feeding, as is well known. Under proper management, in well constructed stalls, all these evils would be alike removed, and they would be kept perpetually in a proper state of coolness, tranquillity and ease, so as to make the same quantity of food go farther in nourishing them, than it otherwise could have done. They would also be prevented from licking up snails, worms, and other noxious creatures, among their food, which by pasturing they are apt to do, when they feed at those times of the day, or night, when these creatures crawl abroad. This would be entirely avoided by cutting the grass at those times of the day when none of these are to be found. Thus, lingering diseases might often be avoided, which always retard the thriving, and often prove totally the destruction of the animal. And, *lastly*, by giving an opportunity of administering dry and nourishing food, along with the soft and succulent, where circumstances requires it, in any requisite proportions, and by varying the tastes, so as to provoke an appetite, not only the health, but the thriving of the creatures, would be greatly augmented beyond what they otherwise could have been.

Under *the third* head. If *Manure* is to be chiefly attended to, there can be no comparison be-

tween the two modes of consumption. This is so greatly in favour of stall feeding, that it would be idle to spend time in searching for proofs of a proposition, that may be considered as self evident.

In the *last place*. If the *quantity* of herbage produced from the same field be adverted to, it will be found to be equally in favour of the cutting system. It is well known, that all animals delight more to feed on the young fresh shoots of grass, than those that are older. Hence it invariably happens, that those patches in a pasture field that happen to have been eaten once bare, in the beginning of the season, are kept very short ever afterwards throughout the whole of that season, by the creatures delighting to feed upon them in preference to the parts of the field that have got up to a greater head; so that these last are suffered to remain, in a great measure, untouched, throughout the season. It is not however, in general known, that grass, even the leafy parts of it, when it has attained a certain length, becomes stationary; and, though it will retain its verdure for some months in that state, makes no sort of progress whatever; whereas if it had been cropped down frequently, it would have continued in a constant state of progress, advancing with a rapidity in a great measure proportioned to the frequency of its being cropped. For experimental proofs of this fact, see Essays on agriculture and rural affairs vol. 2. disquisition 5. Nor has the diminution of produce that must thus be incurred, ever been adverted to by persons who are interested in it; nor have these circumstances entered in any respect into their estimation. From my own experiments and observations, however, I am satisfied that, in some cases, the actual produce of the same field, by a judicious management *in this respect*, compared with bad management, may be augmented *fourfold* in the same season. It is owing to this circumstance, though the reason of the fact has not been understood, that hard stocking of pasture lands has been found to enable the same field to sustain a much greater weight of stock, than it would do when lightly stocked. But under no system of management can the evil of unequal cropping of land under pasturage be avoided, unless it be by a destructive degree of hard stocking, which must be avoided where the animals are expected to thrive. By cutting with the scythe frequently, so as to keep the grass always short, and therefore in a state of continual vigorous vegetation, all these evils are avoided. The quantity of produce will be raised to the *maximum* that the land, in its present state is capable of producing, while the stock to be fed by that produce need not be in the smallest degree stinted in point of food.

Under every point of view, then, that this question can be considered, we are forced to conclude, that the practice of cutting of grass, and consuming it green, in all cases where the ground is in a state that can admit of it, when compared with that of pasturage appears to be so greatly economical, that the particulars under which that mode of management can be practised, and the peculiarities affecting it, deserve to be much more minutely investigated, than they ever yet have been.

In confirmation of the justness of this conclusion, it is now universally admitted as a fact, that a crop

of red clover, when cut and consumed in the house green, in all cases, will go at least twice as far, when cut, as when pastured upon: some go as high as to say it will go *four times* as far. As every person, who has tried the experiment, agrees, that the saving, by cutting this crop, is very great, that practice has of late years begun to prevail very much; though reason has not yet been able to stem the torrent of ancient prejudice, so as to render it entirely universal.

But the cutting of other grass grounds, and consuming their produce green, seems not yet to have been deemed even practicable, and has not of course been ever thought of being experimentally tried, although I have reason to be satisfied, from some experiments, that I myself have made, and the considerations above stated, that the benefits to be derived from consuming the produce of rich grass-lands of *any sort*, in this way, will be even greater than that which takes place with regard to red clover.

The circumstance that made me first advert to those benefits that might be derived from consuming grass lands by cutting, in preference to pasturage, was merely accidental. I had a pretty long and broad grass-walk, leading from my dwelling-house to a garden, which could be avoided, when inconvenient to walk upon it, by taking another path; and as the pile upon this avenue was extremely close, I found it very pleasing to walk upon it, while free from wet, even when the grass was an inch or more in length. Instead therefore, of having it close shaven like a lawn, every three or four days, and throwing the sweepings away, as usual, it occurred to me, that by cutting it less frequently, I should be able to have all the use of my walk I wished for; while I would at the same time lose no part of the produce. From these considerations, I resolved to have it cut so as to admit of being given with economy to my cows, while in the house. As much grass was therefore cut each day, from it as served my beasts for the time, and so proceeding on regularly, first cutting one side of the walk from end to end, and then the other, the walk being frequently rolled when fresh cut, especially after rain, to keep the surface smooth, so as to allow the scythe to cut quite close. In this manner I not only effected the purpose originally intended, but, to my great surprise, I had soon occasion to perceive, that I thus obtained food for the beasts much greater in quantity, as well as sweeter in quality, than I had ever been able, under any other mode of management, to obtain from the same extent of ground. The grass was cut six or seven times during the season, and at each time the quantity, on account of the extreme closeness of the pile, was much greater than I could have supposed, and of a much sweeter quality also...... There was not in the whole, a single blade of grass, that was either bruised or decayed in any way, so that the beasts devoured it with inconceivable avidity, whereas if, upon such rich land, it had been allowed to stand a little longer, the root ends of the grass would have begun to wither and turn musty for want of air, though the top continued green; some stalks also being choaked by others, would not only begin to rot, so as to become unpalatable to the animals,

but their roots also, being suffocated, begin to die out, and the grass becomes thinner, so as to be longer in springing up after each cutting; and thus the quantity of the produce is diminished, as well as its quality much impaired. Some farmers to whom I shewed this experiment, in the course of its progress, judged, when they looked at the grass while growing, that it would be too short to be worth while to cut it; but when I caused some of it to be cut before their eyes, the *quantity* laid down by each swathe was so much greater than what they expected, as to excite a high degree of astonishment. Some of them even admitted that the quantity of forage thus obtained at one cutting, though it did not, at the most, exceed two inches in length, was, in their opinion, equal to that obtained at one cutting of a field of red clover, when advanced to be in full flower; and my own opinion coincided with theirs. This experiment first suggested doubts in my mind, as to the propriety of consuming rich grass-lands by pasturage, and every observation I have since made, has tended so strongly to add to my conviction, that I have now not a doubt remaining on this head; and I conceive that the loss which is annually sustained by the nation at large, from an inattention to this circumstance, is so great, as in some measure, to call upon me to publish these remarks, with a view to direct the attention of others to investigate the subject with greater care than it has hitherto obtained: for, however inattentive men may be for the present, to these hints, a time will come, if they are made public, when they will claim the investigation of some considerate mind. When that time comes my object will be attained.

Since the former edition of this work was printed, I have met with a publication by Dr. THAER, physician of the *Electoral Court of Hanover*, and published in the first volume of *Communications to the Board of Agriculture*, page 376, in which I am happy to find, that the conclusions I have drawn above, by reasoning from the few facts that have fallen under my own observations, have been confirmed by experience of Baron DE BULOW, and others; which have proved, as Dr. THAER says, that the following facts are incontrovertible.

"1st. A spot of ground, which, when pastured upon, will yield sufficient food for only one head, will abundantly maintain four head of cattle in the stable, if the vegetables be mowed in proper time and given to the cattle in a proper order.

"2d. The stall-feeding yields, at least, double the quantity of manure from the same number of cattle; for the best and most efficacious summer manure is produced in the stable, and carried to the fields at the most proper period of its fermentation; whereas, when spread on the meadow, and exhausted by the air and sun, its power is entirely wasted.

"3d. The cattle used to stall-feeding will yield a much greater quantity of milk, and increase faster in weight, when fattening, than when they go to the field.

"4th. They are less subject to accidents, do not suffer by the heat, by flies and insects; are not affected by the baneful fogs that are frequent in Germany, and bring on

inflammations; on the contrary, if every thing be properly managed, they remain in a constant state of health and vigour."

Dr. THAER believes that the stall system of feeding on green herbage has never been adverted to by the farmers or agricultural writers of Great Britain. It appears that he, in this respect, labours under a mistake, yet it cannot fail to prove very satisfactory to me, to find a practice I have so warmly recommended to the attention of my countrymen, so strongly supported by practical men in Germany. It deserves, however, to be noticed, that the observations of Dr. THAER, seem to respect broad clover alone, and not any culniferous grasses, although I am satisfied, from my own experience and observations, that the economy in the consumption of these last kind of grasses, green in the house, will be much greater than that which will result from the consumption of broad clover in this way. Hence I cannot help warmly recommending the following experiment to the notice of the British farmer, in hopes that some person of enterprize and accuracy, will see it carefully performed. I regret that my present situation does not admit of its being done by myself.

Experiment proposed....To assist such well intentioned investigators, it may perhaps be proper for me here to state what I should conceive to be the most economical mode of consuming the produce of rich grass-lands, that it may be subjected to the fair test of accurate experiments, conducted more at large than the circumstances of my farm permit me to make.

If two fields of rich grass-land can be found of exactly the same extent and quality, the experiment can be fairly made by stocking the one with cattle, allowing them to pasture upon it, and reserving the other to be cut and given to cattle of the same kind, by hand, properly kept in the house; the difference of the profit drawn from each class of beasts, will thus ascertain the comparative value of the two modes of management.

I need scarcely observe, that in order to make the experiment fairly, the two fields should be as much alike in all respects as possible; and in particular that the surface of the land intended to be cut should be smooth and even, so as to admit of being rolled frequently; for which purpose the flatter the ground is in general the better.

Let the field that is to be cut, be carefully shut up from cattle, especially during wet weather; and let it be rolled with a weighty roller in the spring, as soon as it is firm enough to bear the tread of the beasts without hurting the surface, first in one direction, and then in the direction across it. If it be twice rolled in that manner, it will be an advantage rather than a detriment, for it is of the utmost consequence under the mode of management proposed, that the scythe should cut very close, without taking up any earth; one quarter of an inch at the bottom, is as much as a whole inch at the top; so that on account of the quantity of grass to be obtained, close cutting is of the greatest use. It tends also greatly to promote the quick springing up of the succeeding crop, as I have often observed; and by this practice no dead leaves are left, which is unavoidable in rough cutting. Frequent rolling with a weighty roller, while the

ground is a little soft, is absolutely necessary for this purpose; and is also of use on other accounts, as will afterwards be noticed.

The field should begin to be cut when the longest piles of grass on it have attained the height of two inches at most, and proceed regularly day by day, cutting as fast as the beasts consume it, so as to go over the whole in three or four weeks as the weather is warm or cold; when that which was first cut will be ready to be cut a second time, and so on; never omitting to roll it when the weather is moist, and not too wet. The grass should be carried off in a light sparred or wicker cart, drawn by one small horse; this cart to move upon three broad low wheels, placed two on one axle and one on another, below the body of the cart, so as to act as a roller when going over the ground: a cart or rather barrow, of this construction, I had made, and found it a most convenient implement. In this manner the work will proceed regularly, and without trouble throughout the whole season: the beasts should be regularly fed; getting only a small quantity at a time, but frequently, fresh and fresh; giving them sweet water when necessary, and as much grass as they will eat, allowing them proper time for rest. Nothing should be left in their stalls, at these times, to be breathed upon, and thus rendered disgustful to them; and if the house be so constructed as that the beasts can be easily kept cool to a proper degree, quiet and clean, they will thrive abundantly.

From the result of this experiment, when fairly made, and often enough repeated, so as to guard against the effects of accidental unobserved peculiarities, many corollaries may be drawn, that will be found of high importance, in regard to rural economists.

In making this experiment, however, the full result of it cannot be clearly perceived, ueless it shall be continued for several years; for in the course of time, many important changes may be expected to follow, as well in regard to the quantum of the produce of the two fields kept under these two modes of management, as in regard to its qualities. The experiment of one year can do little more than ascertain what is the result while the produce is nearly of the same quantity and kind; but as changes in both these respects may be expected, the comparison between the real benefits to be derived from the one or the other mode of management, might be very fallacious, were it not continued for several years; and to do justice to the experiment, the whole dung made by the beasts in the house, should be returned to the field which produced their food.

Grass lands, if constantly cut, are not deteriorated.....What the changes would be, both in regard to the quantity and the nature of the produce from the same field, if annually cut, and the produce carried off, as above mentioned, or if consumed by suffering beasts to pasture upon it, cannot at present be told with certainty; but there are not wanting facts that enable us to have some idea of the probable result.

It has been rendered probable, at least, from facts already stated in this essay, that dung when dropped upon land by cattle pasturing upon it, does not tend to enrich it perhaps at all; or if it does so, it is only to a very small degree.

Whether *rich* grass land, if constantly cut, and the produce carried off from it, without returning any

of the dung, will thus, in time, come to produce crops less abundant than the same land would have done, if kept under pasturage, will not, with many persons, seem to admit a doubt: yet there are considerations which so strongly operate upon my mind for doubting if this be the case, that nothing short of actual experiment can remove those doubts. I have often seen lawns around gentlemen's houses that have been kept under a course of continued shaving from time immemorial, that discovered no symptoms of exhaustation, nor any sensible diminution of luxuriance or of verdure, though no manures of any sort had ever been laid upon them. And as we have already seen that rich grass land, under pasturage, produces as much dung as ought to manure each year more than double its own extent of surface; it follows, that if the same quantity of grass land will only nourish as many beasts in the house, as if it were pastured upon, (and there are strong reasons for thinking it will do much more), there can be annually obtained from each acre of land kept under the scythe, as much dung as might manure two acres more, which might be abstracted from that grass land without deteriorating it. Of course, if the land be such as that it can admit of being made richer, a dressing of that dung, now and then returned upon itself, would give it the richness wanted, without any extraneous aid. In this point of view then it seems to be impossible to deny, that rich land, if kept under the scythe, can never become poorer, if none of the dung made by the beasts fed upon it be abstracted from it; but that on the contrary, it can thus be made to afford a large annual supply of dung for the purpose of enriching poorer land, while it still continues to be equally fertile itself.

In regard to the other practice recommended, there seems to be no doubt but that the *quality* of the grass must continue to improve while under the scythe, much more than while under pasturage. Every person who has bestowed the smallest attention to objects of this sort, must have remarked, that the worst kinds of grasses grow most freely upon those parts of rich grass lands that are the most open and spungy in their texture; and that they are in general much sweetened in the pile, where they chance to be much trod upon. Hence the finest grasses, on such fields, are always found to abound most upon those paths, which are moderately trod upon; white clover and the sweetest grasses being seen there in abundance, while they are less frequent in the spungy parts of the field. But frequent rolling tends to produce this effect more universally and equally, than any kind of treading by beasts, (a practice frequently recommended by the best farmers) ever can do.

Again.....It has been frequently remarked by intelligent farmers, that the hard stocking of land tends much to improve the quality of the pastures, as well as its quantity. On this subject as well as on many others, the observations of Mr. Davies of Longleat, in his account of the agriculture of Wiltshire, deserve to be particularly adverted to. He observes, p. 18, that "the sweetness of the feed depends much more on its being kept close, *and eaten as fast as it shoots*, than on any peculiar good quality of the grass itself: for there are many downs that, when close fed, appear to be a very sweet pasture, but

which, if suffered to run a year or two without a full stock on them, will become so coarse, that sheep *will almost as soon starve as eat the grass: the closer the downs are fed, the more stock they will keep.*"

The above full statement of the advantages of soiling, over the common practice of pasturing, has been given in the words of the truly excellent Dr. ANDERSON, with whom the editor has had the pleasure to correspond since the year 1795.

It is suggested by a friend who thinks well of the plan, that cattle confined in stalls will be too much heated during the summer months, and their health affected: but surely stalls may be constructed under trees, so as effectually to secure the animals from the flies, and at the same time enable them to enjoy air. An attention to both these particulars is indispensable to the preservation of their health, and the speedy fattening of the animals.

The grass must be cut in the morning for the evening food, and in the afternoon for the morning mess; the afternoon crop must be carried to the barn, and spread to exhale its superfluous moisture; and in rainy weather, both crops must be taken off the ground. Attention must however be paid to the due proportion to be cut, and until the fact be ascertained, Mr. BORDLEY recommends to measure each mess, and chalk down how much a basket, or cart body, holds of the articles in weight. The practice will at least have a tendency to teach servants to observe *method*, the value whereof is considerable in all business. On the supposition that 75lb. of green clover alone, will suffice for one beast, (and thirty-two heads are to be fed) 1,200lbs. will be cut twice a day. Eight acres cut four times in the season of soiling, will give one cutting in six weeks; or nearly thirty perches are cut daily. A man and boy may perform all the work and attention in soiling the above number.

Upland blue grass *(poa compressa)* is particularly proper for soiling, because it inclines to grow rank and hard, and to bind the soil, and therefore will bear close and frequent mowing. But whether the practice of soiling or pasturing be followed, it is essential that the grass be *occasionally changed.* All animals thrive better for a change of food.

In cases, however, where it is impossible to *soil*, the next best method is to make a proper division of the land, and to proportion the number of head to the quantity of acres. Cattle should be changed from a field whenever the grass is eaten short: otherwise they will fall in flesh, and additional time and grass will be required to bring them to their former standing. It is only by regular full feeding, that cattle will soon be brought to look well, and to be fit for market.

Where a small number of cattle are fed, and it is necessary to turn them into a clover field in the close of the day, a man should watch and turn them out the moment they are satisfied, otherwise they will lie down, or stroll about, and by blowing on the grass, will cause great waste.

Cattle fed in the meadows south of Philadelphia, are generally kept one year before they are sold..... They are *pastured* one summer, and then stall fed upon hay, and 4 quarts of meal of Indian corn, *(Zea Mayz)* and 3 quarts of chopped potatoes 3 times a day. In the spring and early in the summer, they are sold. In some cases they are fed on hay alone, in which case

they require two tons per head; but having short feed as above each requires but one ton. Hay composed of white clover and timothy (*phleum pratense*), fattens quickest. One grazier thinks that the second crop of blue grass and clover is best to make hay; but a farming friend thinks that this mixture is not nourishing, though cattle will eat more of it. In stall feeding cattle, it is a common practice to give a certain mess every day without regard to any circumstance, but an experienced feeder deems this practice absurd, and justly observes that a bullock will eat with a much keener appetite on a clear cold day, than in warm damp weather; his mess ought to be proportioned accordingly. By giving the same quantity every day, the animal may be induced to over-eat itself, and many days may elapse before he will recover his appetite. By this delay he may fall away, and time will be required to bring him to his former good flesh. The waste hay, or that made from grass mowed after the cattle, is used commonly to feed the stock when the winter sets in; the best hay being reserved for the spring before the beasts are turned out to grass. A handful of salt is broad cast over every load as packed in the loft, and so grateful is this condiment to them, that they have been observed to prefer poor hay salted, to good hay unsalted.

The economical Flemish and German practice of boiling the potatoes, corn, &c. is not followed. But there can be no doubt that a portion of liquid food given every day, would have an excellent effect in producing an open state of the bowels, in loosening and softening the hide, and keep the animals in better plight, than by confining them to dry food. Beans, mashed potatoes, mashed turnips, rye, Indian corn and oats, coarsely broken, should be boiled with a large proportion of water, and given warm: salt may be added when the mess is poured into the troughs. Corn blades and corn stalks may be also boiled with double advantage instead of giving them dry. The Germans in Lancaster county, now chop their corn cobs by means of mills, and with great benefit. If boiled, they would still go further, for their juices having been extracted by the water, would nourish, while the solid substance would stimulate by its quantity, and thus combine the characters of a strong food.

A boiler properly constructed, so as to save the heat, would render the expense of its erection a trifle; and this trifle would be more than balanced by the greater quantity of nourishment afforded by the process.

Cattle fed on a mess of sour food, prepared by fermenting rye flour and water, and then diluted with water, and thickened with hay cut small, are said to fatten beasts quickly. It is known that hogs derive more benefit from sour milk and swill than when fresh, and it is highly probable that good effects may be derived from acid food for horses, but it can only be considered as preparatory to the essential article *Indian corn* (*zea mayz*), without which neither steer, or hog will acquire that firmness in muscle and fat which are so deservedly admired.]

Much, however, depends in the fattening of cattle, on their "*thriving disposition*: singular as it may appear to many of our readers, the

tendency of animals to become fat, is not a little promoted by what is called *sweating them*; a practice which has been attended with uncommon success. This has been particularly experienced by the ingenious Mr. MOODY, who asserts, that the hotter cattle are kept, the better they will fatten. He therefore, shuts them up in an ox-house, and for some time admits no air to enter through the holes of the doors. The breath of so many beasts, and the heat of their bodies, soon make them sweat exceedingly, and when this is at its highest point, they most speedily fatten. After sweating two weeks, all the hair falls off, a fresh coat appears, and they sweat no more: but those beasts which do not sensibly perspire, seldom grow fat.

Linseed oil-cake remarkably contributes to the fattening of cattle, and renders their dung much richer than any other vegetable aliment; but, as this article is advancing in price, and difficult to be procured, it has lately been superseded by linseed-jelly, which is incomparably superior, and when given with hay or meal, makes an excellent mixture for stall-fattening. It is prepared as follows: To seven parts of water put one of linseed, for 48 hours; then boil it gently for two hours, stirring the mass continually, to prevent it from burning. It should afterwards be cooled in tubs, and mixed with meal, bran, or cut chaff. Mr. MOODY gave two quarts of this jelly every day to each large bullock, which amounts to little more than one quart of seed in four days, and is a great saving in the article of food.

[A grazing friend tried the effects of linseed oil, mixed with Indian corn meal, upon a steer stall fed. The animal was observed to *thrive rapidly*, and *to sweat profusely*. But through inattention, too much oil was once mixed with the food, which disgusted the animal, and occasioned the cessation of the experiment.

Flaxseed jelly would no doubt be more agreeable to the animals, less liable to surfeit from an accidental over proportion, and less liable to affect the meal with a peculiar taste, than either oil or cake, and therefore deserves to be tried.

To each head may be given, about half a gallon of jelly daily, mixed with meal and cut straw. But this food ought to be changed about one month, before the animal is killed, to prevent the possibility of the flavour of the oil, cake, or jelly, remaining in the flesh.]

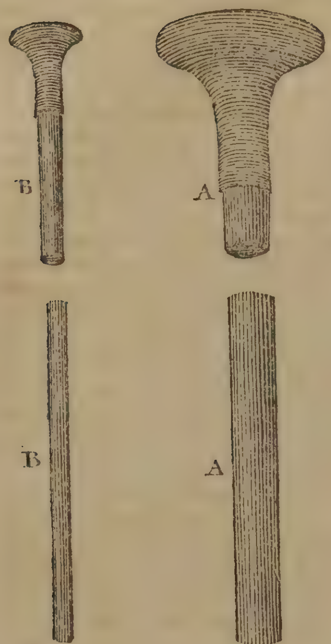
Having already, in the articles BLACK CATTLE and BULLOCKS, stated the most proper method of fattening cattle, we refer the reader to those heads, and proceed to discuss the last section of this subject.

III. THE DISEASES OF CATTLE.

No distemper is perhaps more common among these useful animals, than that of being swoln, that is, *blown* or *hoven*, as it is termed by farmers. It arises either from their being exposed to damp situations, or from eating too greedily of any succulent food, such as turnips, clover, particularly *red clover*, which is a dangerous food for horned cattle; for, when wetted by dew or rain, it may prove a destructive poison. For this fatal malady, various remedies have been tried, with more or less success, of which we shall select the most effectual and expeditious. The general prac-

tice is, to make an incision with a penknife in the body of the affected animal, [under the short ribs, and a tube of ivory, bone, or smoothed elder put in:] in order to give vent to the confined air: the wound is then covered with a common or adhesive plaster, to prevent external cold from penetrating it; and thus the danger, in general, is speedily removed. But, where it is practicable, it surely behoves us to employ more gentle remedies for the alleviation of this disorder: we, therefore, extract with satisfaction, the following recipe from the 33d volume of the *Annals of Agriculture*; where it is announced as a specific for hoven cattle, even in the most desperate cases; effecting a cure within the short space of half an hour.....Take three quarters of a pint of olive oil; one pint of melted butter, or hog's lard; give this mixture by means of a horn or bottle; and if it does not produce a favourable change in a quarter of an hour, repeat the same quantity, and walk the animal gently about. For sheep attacked with this malady, the dose is, from a wine glass and a half to two glasses. Besides these remedies, instruments have been invented for the purpose of relieving blown cattle: two of these contrivances we shall describe, as being particularly distinguished for the ingenuity of their construction, and the speedy relief they afford. The first is a flexible tube, invented by the celebrated Dr. MUNRO, Professor of Anatomy at Edinburgh: it consists of iron wire, about one sixteenth of an inch in diameter, twisted round a rod three eighths of an inch in diameter, and made of polished iron, in order to give it a cylindrical form; the wire, after being taken off the rod, should be covered with smooth leather. To the end of the tube, which is intended to be passed into the stomach, a brass pipe two inches long, of the same size, or rather larger than the tube, is to be firmly connected: and to prevent the tube from bending too much within the mouth, or gullet, an iron wire, one eighth of an inch in diameter, and of the same length as the tube, is put within it, but afterwards withdrawn, when the tube has entered the stomach..... As Dr. MUNRO has ascertained that the distance from the foreteeth to the bottom of the first stomach of a large ox, is about six feet, the tube ought, therefore, to be at least two yards long, that it may operate effectually in the largest oxen. When the instrument has been introduced into the stomach, it may remain there for any length of time, as it does not obstruct the respiration of the animal: the greater part of the condensed air will be speedily discharged through the tube; and, should any ardent spirits, or other liquor calculated to check the fermentation, be deemed necessary, it may be safely injected through this pipe. In short, the flexible tube here described, has been found of infinite service in saving the lives of cattle, and especially of sheep, when subject to similar disorders, or any other swelling peculiar to these creatures.

Another *Instrument for relieving hoven cattle and sheep*, is that contrived by Mr. RICHARD EAGER, of Graffham farm, near Guildford. Its peculiar simplicity, and great utility, have induced us to subjoin the following representation.



A, A, is the knob of wood, and part of the cane to which it is fastened, of a proper size for oxen: the length of the cane should be at least six feet.

B, B, is the knob of wood and part of the cane, calculated for sheep, and the length of which ought to be about three feet.

When any beast is blown or hoven, Mr. EAGER directs a person to lay hold of it by the nostril, and one horn, while an assistant steadily holds its tongue with one hand, and pushes the cane down its throat with the other. Care, however, should be taken, not to let the animal get the knob of the cane between his grinders, and also to thrust it down far enough; because its whole length will do no injury. As there will be found an obstacle at the entrance of the paunch, the cane must be pushed with additional force; and, as soon as a smell is observed to proceed from that place, and the animal's body sinks, the cure is performed, and Nature will complete the rest.

Mr. EAGER justly attributes this disorder to the superabundance of air introduced into the stomach, by eating too large quantities of succulent food, which occasions a greater than natural portion of wind to ascend from the paunch of the beast. This forces the broad leaves before the passage, at the entrance of the stomach; and these leaves prevent the wind from passing upwards in its regular course. Thus the paunch immediately begins to swell; the heat of the body rarefies the air, so rapidly as to impede the circulation of the blood, and the animal, whether bullock or sheep, unless instantaneous relief be procured, expires in half an hour.

In justice to Mr. EAGER, we cannot omit to mention, that the *Society for the Encouragement of Arts, &c.* in 1796, voted to him a reward of fifty guineas, for communicating to the public his simple, yet effectual, method of relieving cattle thus dangerously affected; and that the Earl of EGREMONT has candidly testified his conviction of the propriety of the principles on which Mr. EAGER's opinion, relative to the cause of that distemper, was established. In short, several respectable persons have farther attested, that the practice, also, has been attended with complete success.

[The Rev. Mr. E. PARSONS of E. Haddam, Connecticut, describes a disease in the *Medical Repository, New-York*, vol. 1. which has been

very destructive to horned cattle in Connecticut for ten years past. It is chiefly confined to cattle under three years....Cows are sometimes attacked, but oxen rarely. It has been most fatal to calves in autumn and to yearlings in May and June. The largest and highest fleshed are most liable to the disease.

The vulgar name for the disease is "*The mortification*." The symptoms are, unwillingness to move, a soft swelling in the leg, shoulder, flank, side, but oftener in the back and region of the kidneys. In the course of six, twelve, or twenty-four hours, life terminates with little expression of pain. The stink before death is intolerable. Upon skinning, the swollen spot is found to contain a jelly and black blood.

The cause of the disease is supposed to be too much fulness, or *plethora*, as it proves destructive to cattle after a change of pasture or fodder, from bad to good. Many calves have died after feeding in the fields of grain.

The remedies are chiefly of the preventive kind, such as bleeding, or a change of pasture of a better quality, and care not to permit a sudden change, from bare to full bite. One person bled copiously in the neck, gave the animal his own blood to drink, which purged; and then made an incision in the swollen spot, took out the jelly and gore, and filled the cavity with rum and salt; after which the recovery was gradual. Three head of cattle thus treated, recovered: on all the rest this treatment had no effect, either good or bad.

A disease which originally appeared in a drove from North Carolina, in the autumn of 1796, spread devastation throughout the country among the cattle as it passed. The editor first heard of it near Columbia, on the Susquehannah, where the drove remained *one night* in a ploughed field. The stock of the farm were seized in a few days afterwards, and many perished. At the same time the beasts in the drove appeared *perfectly well*. The disease was traced down to Derby, 8 miles S. W. of Philadelphia, where great havoc was occasioned by it. The symptoms were first, disinclination to food, inability to stand, tumbling, laborious breathing, and deep groaning: bloody urine was sometimes discharged. Costiveness, in general, was a symptom. The blood was dissolved when drawn. No remedy was found effectual.

The circumstance attending the above mentioned disease, suggests the propriety of keeping drove cattle separate from an old stock for some time, and of permitting the latter to mix with the former by degrees, in order to see whether a disease appears.

The little attention that has hitherto been paid to the diseases of cattle in the United States, is a matter of very serious concern. It frequently happens that an epidemic rages among horned cattle with great violence, and no more information is communicated respecting it, than what is contained in a newspaper paragraph, though the country abounds with men of education, fully capable of recording a good account of the disease. Such negligence is highly reprehensible, and by continuing it, we shall always remain stationary in our knowledge of the diseases of cattle. The symptoms ought to be described, whether the complaint may or may not be cured; and the various remedies stated, in order to

direct the mode of cure, or prevent the loss of time on future occasions. Many thousands of dollars were lost by the fatal disease mentioned above, and noticed first among the North Carolina drove, and yet no other account of it is to be found, except the imperfect one here given. In Europe, the diseases of cattle are deemed worthy of particular attention by men of science, and professorships are endowed in many universities, for the express purpose of having the physical economy of all domestic animals properly examined. The advantages of these establishments are often perceived, and no time ought to be lost in following the example in the various colleges in the United States. It is well known that England was indebted to a physician (Dr. LEDYARD) for the stoppage of the ravages of a wide spreading epidemic which raged among the horned cattle between 1750 and 1760.

Cattle are also sometimes affected by diseases of the hoof; in consequence of feeding upon hay made of the bog meadow grass. Such a disease was seen by a grazing friend (W. R.) among the cattle in Blooming Grove near Gray Court, New-York, in the winter succeeding the dry summer of 1793. Many beasts lost their hoofs entirely.

A similar complaint was observed by another friend (I. C.) to prevail among cattle from feeding upon the natural grass which comes upon meadows made by banking out the river Delaware, and which are not duly watered. The ends of the blades of the grass become tipped with a black powder similar to rust on grain. Cattle do not relish the grass, and will not eat it unless forced by necessity. Care must therefore be taken to water such meadows at proper seasons.]

There are various other distempers, to which the farmer's live-stock are frequently subject; such as the worms, or botts in horses, the mildew, murrain, quarter-evil, rot, scab, &c. among different species of cattle. With respect to the nature and cure of these, we refer to the order of the alphabet: such of our readers, however, as may wish for more minute information, on the subject of cattle, will probably be gratified by the perusal of Mr. CULLEY'S "*Observations on Live-Stock*," (8vo. 4s. 6d.) a small work that was published a few years since, and is believed to possess considerable merit: also Mr. TOPHAM'S "*New and compendious System on several Diseases incident to Cattle*," &c. 8vo. 1788; a work containing some valuable hints, and of which a new edition was lately published.

Before we conclude this interesting article of national importance, we shall add a few general remarks, tending chiefly to preserve the health, and improve the physical properties of cattle. It is admitted, by all enlightened breeders, that *cleanliness* is one of the most essential requisites to the prosperity of those animals; and we may venture to add that, in this respect, a degree of attention ought to be paid, little inferior to that bestowed on the human frame. Hence, frequent washing, especially after hard labour; friction with proper brushes, and curry-combs, gentle walking after a fatiguing journey; and the immediate removal of litter, both from the stalls, and farm-yards, should not be neglected....

But, alas! let us look around, in the vicinity of London, and inspect the filthy situation of cows, in general, which are kept in a state worse than hackney coach-horses, for the *sole* purpose of giving the greatest possible *quantity* of milk, without regarding its quality..... every judicious person will shudder at the picture. And yet, we derive from these beneficial brutes a considerable part of our daily sustenance, especially for children, and those persons whose organs of digestion have not been impaired by the habitual use of fermented, spiritous, or intoxicating liquors. See Milk.

In a preceding part of this work we have pointed out the great necessity of supplying Cattle with sufficient quantities of common salt; and for the reasons already stated, we are of opinion, that ALL kinds of cattle, especially *sheep*, would be much benefited by the continual use of this simple and natural spice, which eminently conduces to the digestion of succulent vegetables, and is almost a specific for preventing the effects of flatulence. *Salt* cannot be given in excess: it is affirmed, that it *enables the farmer to increase his live-stock*; *as it augments the nourishment of the food eaten*, *in proportion to the quantity of saline matter*. It is also said greatly to improve the wool in quality, as well as quantity. Hence it ought to be freely given to sheep, and cattle of every description: but, to imitate Nature, it should be previously dissolved, and then mixed with a pure, fine clay, in a mass, which is to be placed under shelter, so that the animals may lap it at pleasure: such is the process which the unprejudiced grazier will be disposed to adopt....Lastly, Mr. Bordley, relates a fact worthy attention. About sixty years ago, he learnt, from a country farrier, that, "once or twice a week, giving salt to horses, effectually secures them against *botts*;"....ever since that period, he has experienced the good effects of this management; and adds that, during twenty years' residence on his farm, at Wye, in Maryland, he always kept upwards of fifty horses on the banks of a river, containing *salt-water*, and never met with a single instance of that disease.

CAUDEX, a botanical term, signifying, in general, the stem, or trunk of a tree. It is properly that part of plants which joins together the *plumula*, or leaf, and the *radicle*, or root fibres; and which is called the caudex, by Linnaeus, when applied to entire plants. He consequently divides it into the ascending and descending body of the vegetable: the former contributes to the formation of the trunk, the latter to that of the root. In herbs and shrubs, the caudex is denominated *Caulis*, or the stalk.

Dr. Darwin observes, that, in herbaceous plants, the caudex is generally a broad, flat, circular plate, from which the leaf-stems ascend into the air, and the radicles, or root-fibres, descend into the earth. Thus, the caudex of a plant of wheat lies between the stem and the radicles, at the basis of the lowermost leaf, and occasionally produces both new stems and radicles, from its sides; whereas that of a tulip is situated under the principal bulb, and generates new, though smaller ones, in the bosom of each bulb-leaf, besides one prin-

cipal, or central bulb....the caudex of the orchis, and of some species of the ranunculus, lies above their bulbous roots; but those of the buds of trees constitute the longitudinal filaments of the bark, extending from the *plumula*, or apex, of the bud on the branch, to the base of it, or its root-fibres, beneath the soil.

The elongation of the caudexes, which takes place in the buds of trees, says Dr. Darwin, is analagous to what happens to some herbaceous plants, as in wheat: when the grain is buried two or three inches beneath the soil, an elongation of the caudex occurs almost up to the surface, where another set of fibrous roots are protruded, and the upright stem commences. It is the same with tulip-roots, and also those of many other vegetables, when planted too deep in the earth.

This caudex of the buds of trees, not only ascends, as before described, but likewise descends from each bud to that above it; as on the long shoots of vines, willows, and briars; in this respect, resembling the wires of strawberries, and other creeping plants. Thus the caudex of perennial herbaceous plants consists of a broad plate, buried beneath the soil, to protect it from the frost; while that of the buds of trees is furnished with a long, vascular cord, extending from the bud, on the branch, to the radicle, beneath the earth, and enduring the winter frosts, without injury.

When treating of *vegetable generation*, and the organs of reproduction, Dr. Darwin, in his "*Phytologia*, mentions a remarkable *animal* fact, illustrative of this curious, and important subject: Many insects, such as the common earth-worm, and the polypus, are said to possess so much life, throughout a great part of their system, that they may be cut into two or more pieces, without destroying them; as each part will acquire a new head, or a new tail, or both; and the insect thus become multiplied. How exactly this is resembled by the long caudex of the buds of trees, which possess such vegetable life, from one extremity to the other, that when the head, or plume, is lopped off, it can produce a new plume; and when the lower part is cut off, it will generate new radicles; and thus may be wonderfully propagated. See also Bud, Bulb, and Leaves.

CAULIFLOWER, the *Botrytis*, L. a variety of the *Brassica oleracea*, or sea-cabbage, a native of the Isle of Candia, but, of late years, has been so far improved in Britain, as to exceed, in size and flavour, those flowers which are produced in most parts of Europe.

Cauliflowers are raised from seeds, which ought to be saved only from large, and white flowers; as, without this precaution, they will not prosper. The seeds should be sown in March, in a rich, but not too dry soil, where the young plants, on their first sprouting out, may be sheltered from the evening frosts, which usually happen at that season. About the middle of April, while in their first leaf, they should be transplanted into a nursery, five or six inches apart; where they must remain till the latter end of May, or the beginning of June, when it will be proper to remove them to those spots, in which they

are intended to blossom. The best time for this purpose, is in wet weather, which will make them strike root quickly; but if the season be dry, holes should be dug in the ground, at about three feet distance, which must be well watered, previously to setting the cauliflowers. By these means, and also by watering them frequently, during warm weather, the plants will grow rapidly, and produce large flowers in autumn. It sometimes happens that, notwithstanding these precautions, they will not flower till after Michaelmas; in which case they must be dug out, together with the earth at their roots, and set upright in a green-house, or other warm place, where the blossoms will increase in size, and be fit for use in winter. But, in order to have cauliflowers in the summer, a different mode of cultivation must be pursued. To effect this, the seed should be sown in the beginning of August, on an old cucumber, or melon-bed, over which a little mould should be sifted, about a quarter of an inch thick; this should be shaded with mats, and occasionally watered, to prevent the sun from injuring the plants. About a month after sowing, they will be fit to "prick out," when they should be set four or five inches apart, either under a south wall, to remain there till spring, or in the places where they are destined to blossom, and covered with glass bells during the severity of winter. Thus, and especially by the latter method, the plants will, in the spring, become firmly rooted, and consequently produce larger blossoms than those which are set in that season.

The cauliflowers planted out at Michaelmas, will blow about three weeks sooner than those set in the spring; nevertheless, it is necessary to make plantations in both seasons, that there may be a constant succession of crops. Care should, at the same time, be taken to set them where they may not be exposed too much to the sun, and also to water them well, which will contribute greatly to their growth: M. Bechstein, a German writer, however, asserts, that they will thrive most luxuriantly in the open fields..... As soon as the blossoms begin to appear, it will be requisite to break off the large leaves, and lay over the flowers, in order to shelter them from the rain, and the scorching heat of the sun, which would otherwise cause them to turn yellow.

As cauliflowers are apt to be damaged by the wind, and sometimes to be blown up by the roots, particularly during the months of March and April, they require to be safely protected from its violence. For such plants, therefore, as blossom early, and have large, close flowers, we would recommend the practice adopted in some parts of England, namely, of allowing some of the most forward ones to remain for seed, and tying them carefully to stakes, to prevent their receiving any injury from the wind. As soon as the pods are full grown, and the seeds have arrived at maturity, the whole stalk must be cut off, and dried, previously to the seeds being rubbed out; as they are liable to be shed, if left upon the plants, till the seed-vessels are dry.

Among the succulent plants produced in our climate, this doubtless is one of the most nourishing, and likewise the best adapted to tender organs of digestion, especially in valetudinarians and invalids: such persons, however, ought to eat it with

the addition of some aromatic spice such as pounded cardamoms, or caraway....or a small proportion of bread.

To prepare cauliflowers.....Let the cauliflowers first be par-boiled; next they must be immersed in cold, hard water, for some time, till they be nearly wanted for the table: thus, on being boiled for a few minutes, they will become more firm and crisp than if they had been cooked in the usual manner.

CAUSTICS, in medicine, are remedies, the operation of which resembles that of fire; by destroying the texture of the part to which they are applied, and converting it into a substance not unlike burnt flesh.

Those bodies which possess causticity, are, when taken internally, mortal poisons: so powerful is their action, in general (for instance, arsenic), that cautious physicians hesitate to prescribe it, even externally. There are, however, several others, which may be in a great measure divested of this deleterious quality, such as the nitrous acid, or aqua fortis; lunar caustic, or a solution of silver in nitrous acid; common caustic, or pure kali; either of which are daily and successfully used, especially for extirpating fungous flesh, removing warts, &c.....See CAUTERY.

The causticity of bodies depends, principally, on the state of the saline and acid matters which they contain. When the latter are concentrated and attached to the substances with which they are combined, they possess great activity, and are corrosive or caustic. In this manner, both fixed and volatile alkalis, though already caustic, acquire that property in a far greater degree, by being mixed with quick-lime; as this substance deprives them of a portion of unctuous and inflammable matter, and divests them of all their fixed air, which binds and restrains their saline principle.

The late Dr. BLACK, when treating on this subject, observed that the compounds produced by the union of metals with acids, are in general corrosive. Many of them, when applied to the skin, destroy it almost as soon as mineral acids; and some of the most powerful cauteries are made in this way. Others are supposed to be more acrid than the pure acids themselves, and produce apparently more powerful effects, when taken internally. Thus, a person may swallow ten or twelve drops of spirit of salt, without feeling any inconvenience; but the same quantity of acid, previously combined with silver, quick-silver, copper, or regulus of antimony, will throw the whole body into violent disorder, or even prove fatal, if taken in one dose.

Caustics are not at present in general use; they are, however, applied occasionally in abscesses, to produce an orifice, and to give vent to the suppurating matter; as likewise to make issues in parts where incision is difficult, or dangerous, on account of the contiguous blood-vessels.

CAUTERY, a surgical term given to substances which corrode or burn any solid part of the body: they are divided into two classes, *actual* and *potential*. By the former are understood red-hot instruments, which were much in use among the ancients, and are still employed by several barbarous nations, as their almost only means of curing diseases; but, in the modern practice of Europe, they are

seldom resorted to, except for the *firing* of horses and cattle.

Some practitioners, however, cauterize with burning tow, others with cotton, or *moxa* (particularly the inflamed part of a toe, for preventing a fit of the gout); others again with live coals, Spanish wax, pyramidal pieces of linen, &c. But of all actual cauteries, the most expeditious and least painful, is that of strewing on the wound a small quantity of the finest gun-powder, and then setting it on fire: a method which, particularly after the bite of a mad dog, has generally been attended with the happiest effect, while it always renders the operation with the knife unnecessary.

Potential cauteries are those which we have already explained under the head of CAUSTICS. In this place, therefore, we shall only observe, that one of the most effectual methods of cleansing foul, indolent ulcerations, and checking the progress of mortification, especially in the legs, is the cautious application of the following lotion: Take thirty grains of *lunar caustic*, dissolve it in a pint of the purest spring, or twice filtered water. If it produce a burning sensation which continues too long for sustaining the pain in the part affected, wash the ulcer with pure water, and make the solution weaker every time it is applied. Although this, in general, proves an excellent remedy in those cases, yet as it is a powerful caustic, we do not advise an indiscriminate use of it, without consulting professional men.....See ULCERS and WARTS.

CAVADILLA, a plant but little known, though its seeds have long been applied externally to destroy vermin; as they produce a considerable irritation in the skin...... Lately, however, the celebrated SCHMUCKER has successfully administered these seeds internally for the same purpose, in the following manner: Half a dram of the powder mixed with honey, was ordered to be taken, on an empty stomach, for five successive mornings; after which he prescribed a brisk laxative. By this treatment, the cavadilla has, by several Continental physicians, been observed to expel the *ver-solitaire*, or *solium*, a species of tape-worm extremely difficult to be removed. It is farther affirmed, that in a variety of cases it uniformly produced that effect.

CAVIAR, a species of food chiefly imported from Russia: it is made of the hard roes of the sturgeon, formed into small cakes, about an inch thick, and three or four inches in breadth; but sometimes the whole is loosely packed up in small kegs. It is prepared by taking all the nerves or strings out of the spawn, washing it in white wine vinegar, or spreading it on a table, then salting and pressing it in a fine bag; after which it is put into a vessel perforated at the bottom, to allow the moisture to run out, if any should remain.

From the latest accounts published by Professor PALLAS, in his *Travels into the Southern Provinces of the Russian Empire, in the years* 1793 *and* 1794 (an English translation of which, by the editor of this Encyclopædia, is now in the press), it appears that caviar is made of the following three species of fish, caught in the river Volga and the Caspian sea: 1. *Belugas*, or the great sturgeon, of which there are taken annually 103,500; each fish being worth, upon an average, two

rubles and a half, or from six to seven shillings sterling: the roe, or caviar, of 1000 sturgeons weighs 4000 Russian pounds, so that this number yields 414,000 pounds, and the value of each *pood*, or forty pounds, is generally computed at three rubles and a half; 2. The little sturgeon, of which there are taken every year 302,000, yielding 724,800 pounds of the roe; and 3. The *Sevrugas*, or *Acipenser stellatus*, L. the annual produce of which is not less than 1,345,000, caught in the different fisheries; and from which 3,228,000 pounds of caviar are obtained: or from the whole number of 1,750,500 fish, 4 million 366,800 pounds of caviar........See also ISINGLASS.

PALLAS observes, that it would be difficult to find in the whole world, a fishery more productive to the natives, and advantageous to government, except that on the banks of Newfoundland. During the long Lent of the Greek Church, and the weekly fast days, which together are at least four months in the year, this fishery affords the principal food to the whole European part of Russia, and its populous capitals. No caviar was exported in British vessels till the year 1781, and only 1040 pounds (Russian weight) of that commodity were sent to England in 1782; but the increase of this trade was so rapid, that in the following year, 46,040 lbs.; in 1784, 64,480 lbs.; in 1785 and 1786, above 40,000 lbs.; in 1787, nearly 64,000 lbs.; in 1788, 160,000 lbs.; and in 1789, not less than 450,160 lbs.; but in 1790, only 1000 lbs.; and in 1792, 151,240lbs. were shipped in English vessels.... The exportation to Italy has also amounted to upwards of 400,000lbs. during the last-mentioned years, exclusive of about 120,000 lbs. to other countries, and a still larger quantity through the ports of the Black Sea, and that of Azov.

At present, the annual value of the sturgeons caught in the waters of Astrakhan, and the Caspian sea, amounts to 1,760,405 Russian rubles; a great part of which is paid in British money, for the articles of isinglass and caviar. These fish proceed in shoals to the mouth, and a considerable way up the current of rivers, without the least apparent diminution of their numbers. As the Persians eat no sturgeon, the fisheries of the Sallian are rented by Russians, who, during the spawning season, take 15,000 large fish in one day with the hook, at the weirs formed across the water: nay, it is remarkable, that if the fishermen be accidentally prevented from working but for a single day, the fish accumulate in such numbers at the weir, as to fill the whole channel, so that the uppermost appear with their backs above water, in a river not less than 28 English feet deep, and 60 fathoms wide. But those injudicious fishermen, after having collected the roes for caviar, and the air-bladders for isinglass, throw the body of the fish into the sea as useless......See MANURE.

With regard to the physical qualities of caviar, we shall only remark, that it is a nourishing food, and more easily digested than pickled salmon; it somewhat resembles in taste, and nutritive property, the essence of anchovies; though few persons, on first trial, relish its flavour.

[As the sturgeon abounds in the rivers of the United States, caviar might be easily made in immense quantities. At present the roes are

thrown away; the young sturgeon is pickled in Virginia, and deservedly esteemed.]

CAYENNE PEPPER, one of the most heating and stimulating spices with which we are acquainted. [It is the produce of the *Capsicum Annuum*, L. The plant varies extremely in its fruit. There are several species of Capsicum, most of which are natives of both Indies; but they have been chiefly brought from Cayenne, Surrinam, and the West Indies. The well known preparation, called *Cayenne Pepper*, is made from the pods of the smaller sorts of Capsicum.]

This powerful spice, in a state of powder, has lately become the companion of the table, and is much esteemed for its flavour, and the quality it is supposed to possess, of promoting the digestion of fish, and other articles of strong food. We are, however, of opinion, that such practice is not conducive to health, in general; for, though Cayenne pepper, like high flavoured Indian *soys*, may occasionally assist digestion, we would preferably advise those who stand in need of artificial stimulants, if they value their constitution, to abstain from dishes requiring a vigorous stomach, rather than resort to precarious and destructive means.

Dr. UNZER mentions a preparation of Cayenne pepper, called *chiquetaille*, which is so powerful a caustic, that the smallest portion of it applied to the skin, burns more violently than fire: he advises, therefore, in accidents of this nature, immediately to wash the part affected with brandy, which procures speedy relief.

[CEANOTHUS AMERICANUS, *New-Jersey Tea*. This shrub seldom rises more than three or four feet high, sending out branches on every side from the ground upward. The branches are very slender, and are garnished with oval pointed leaves, having three longitudinal veins running from the footstalk to the point, and diverging in the broad part of the leaves from each other: the leaves are placed opposite, are deciduous, and of light green colour. At the extremity of each shoot, the flowers are produced in close thick spikes, and are composed of five small petals, of a clear white. These appear in June.

During the revolutionary war, the leaves of this shrub were dried and used as a substitute for common tea. The plant is said to dye wool a fine strong nankin cinnamon colour.]

CEDAR, or the *Pinus Cedrus*, L. a species of the pine-tree, usually called the Cedar of Libanon, is a native of Syria. It is an evergreen of the larger kind, bearing roundish cones, with smooth, erect scales, each fruit about five inches long, and four in circumference. The cedar attains a considerable size, and is said to arrive at a greater age than the oak. It appears to have been introduced into England towards the latter end of the 17th century, and may be easily propagated by seed; as it will grow on a poor sandy soil with a mixture of clay. Plantations of this beautiful tree might conduce to the ornament as well as convenience of domestic life: for the wood of cedar is not subject to the depredations of worms, and is admirably calculated to withstand the effects of moisture: hence attempts have been made to imitate it, by dyeing inferior wood of a red colour: but the fraud may

be easily detected by the smell, as that of the cedar is very aromatic. Beside the numerous articles of the cabinet-maker and joiner, the wood of cedar is also made into moulds for black lead pencils.

[Both the red and white cedar are natives of North-America. The former grows to a height of fifteen or twenty feet. Its berries are smaller than those of the true juniper.] It has some seminal varieties, some trees producing, as they grow up, leaves similar to those of the cypress, while others more resemble those of the juniper. It is a most durable wood, especially for posts, which, when once fixed in the ground, will stand unimpaired for a century. It was formerly in much request in America, for chests and wainscoting; but its smell being rather disagreeable, it is now almost entirely disused.

The *white cedar* from its very small cones, resembles the cypress. From its bark are gathered small lumps or grains of dry resin, called *olibanum*, or frankincense. The wood of this tree is much used in America for shingles, and has a sweet smell, not unlike cinnamon. Both these last mentioned varieties delight in a dry sandy soil; and, if planted in England, would add much to the beauty of the country.

[*Cedar, Red and White.* These two celebrated trees are of different genera. The first is the *Juniperus Virginiana*, and the latter, *Cupressus Thyoides.* The red cedar is famous in America for affording the most durable fence posts, and in Bermuda for its durable and light timber, in the construction of fast sailing vessels. In Virginia and Carolina the berries of this tree are distilled into brandy. The wood is said to preserve furs or woolens enclosed in boxes of it from being touched by moths. The white cedar, affords one of the most useful woods in the United States, particularly for covering houses, and other buildings: most of the houses of Philadelphia are roofed with shingles made of this wood. It is preferred to all other wood for the purpose before mentioned, as well as for fence rails, boarding frame buildings, and all sorts of inside work of houses, particularly, where paint, varnishing, or paper hangings are intended; it is preferred to all other wood, for coopers-ware, such as wooden cisterns, tubs, pails, churns, &c.

This celebrated tree possesses an extensive range on the Atlantic coasts, from New-Jersey southward as far as East and West Florida. Its natural situation and soil, is the flat country, near the sea shore and fifty or sixty miles back, where swamps, or a wet morassy soil abounds, but will grow very well if planted in higher land, provided the soil be sandy and moist.]

CEILING, in architecture is the top, or roof, of an upper room, made of plaster, laid over laths nailed on the bottom of the joist of the upper room; or, where there is no upper room, on joists made for that purpose, which are therefore called *ceiling joists.*

Plastered ceilings are in much greater use in England than in any other country of Europe; they are preferable to papered, or other ceilings, as they make a room not only lighter, but also prevent the dust from penetrating through crevices; lessen the noise from above; check the progress of accidental fires;

and, during summer, contribute to cool the air....See MORTAR, and PLASTER of PARIS.

CELANDINE. See CHELIDONIUM.

[CELASTRUS, *Climbing Staff Tree*, nearly allied to *Euonymus*. Three species of this genus are found in the United States. C. *bullatus*, c. scandens or climbing staff tree: c. myrtifolius. The second species possesses all the powers of sarsaparilla.]

CELERY, a variety of the *Apium graveolens*, L. originally denominated smallage, or parsley. The root, in its wild state, is thick and fibrous; its bushy stalk attains the height of two or three feet, and bears yellow flowers in August: it grows in ditches and salt-marshes, is fetid, acrid, and noxious; but when cultivated in dry ground, it is divested of those qualities, and then called CELERY.

There are two remarkable varieties of this vegetable: 1. The *shrubby celery*, which is raised from seed: it should be sown at two or three different times, in order to preserve it the better for use during the season, without running up to seed. The first sowing ought to be in the beginning of March, on a gentle hot-bed; the second towards the end of the same month, in an open spot of light earth, where the plant can enjoy the benefit of the sun; and the third in the latter end of April, or the beginning of May, on a moist soil; where it may be exposed to the morning sun only, but not too near trees, as the wet occasionally dropping from their leaves tends to retard its growth.

Towards the middle of May, some of the roots of the first sowing will be fit to be transplanted into trenches for blanching. These must be cut at the distance of three feet from one another, about eight or ten inches in width, and of the same depth; the mould dug out of them should be equally laid on each side, that it may be ready to draw in again, and to earth up the celery, as it advances in height. As soon as the trenches are made, the plants, having been previously trimmed, and the tops of the long leaves cut off, must be set in the middle of them, about four or five inches apart; care being taken to close the earth well around them, and to water them plentifully, until they have taken new root. When about half grown, the lateral fibrous roots should be carefully removed with a knife, and the earth again placed round the parent root, without burying the hearts. By repeating this operation, as occasion requires, Mr. KIRCHNER, a German gardener, asserts that he obtained celery roots of an extraordinary size. The last crop should be planted in a drier soil; and, in order to prevent it from rotting in the winter, it will be necessary to cover it, when the frost is severe, with pease-haulm, or some similar substance, which admits the access of air. Care should, however, be taken to remove this covering as soon as the weather becomes milder; for otherwise the celery will be apt to *pipe*, and run to seed. When full blanched, this root will not continue good above three weeks or a month; hence to preserve it, and insure a succession of crops, it is necessary to have, at least six or seven seasons of planting, proportioned to the consumption.

2. The *bulbous celery*, generally called, by gardeners, French CE-

LERIAC, but seldom to be met with in this country: it produces a large, knobby root, of a delicate flavour, and from three to five inches in diameter. This plant is usually sown early in the spring, on hot-beds, and afterwards transplanted into a deep, and well prepared garden soil, at equal distances of ten or twelve inches from each other, where it will thrive rapidly, if it be frequently earthed up, and watered, as it requires constant moisture.....Having been disappointed in obtaining the proper seed for this variety, instead of which, an eminent old botanist, of Covent-garden market, furnished us with that of the common fibrous-rooted, or *shrubby celery*; we are led to believe, that the latter may be *artificially* converted into *bulbous* roots, by adopting the simple expedient before suggested by KIRCHNER. Although we have no decisive proof of this useful conversion, which might be easily applied to the improvement of many other culinary vegetables, yet there appears to be a considerable prospect of a successful result in many of those plants, now vegetating in a garden at Paddington.

When distilled, the seeds of both, the wild and cultivated celery, produce an essential oil. The roots of the former are eaten by sheep and goats, but cows and horses refuse them.....As an article of food, the celery is well known, but is said to be hurtful to persons subject to nervous complaints. It is, however, considered as an excellent anti-scorbutic.

The *bulbous* root of celeriac is much esteemed on the Continent, where it is preserved in sand for the winter, and eaten chiefly as salad. For this purpose, it is cut in slices, and soaked a few hours in vinegar: by such simple preparation, it becomes as mellow as a pine-apple, and affords a delicious, and very nourishing repast: hence it is much relished by invalids or the aged. We doubt, however, whether it deserve the great character it has acquired among the French and Germans, for its bracing and restorative virtues, in cases of general relaxation and nervous debility.

[Cellery having a solid stalk, is now generally cultivated in and near Philadelphia. The seeds must be sown in March in a hot bed, or in the open ground in a *moist and warm situation*. In six weeks the plants will be fit for putting into trenches, which must be prepared by having some *well rotten* manure put into the bottom. The black mould found on the surface in woods, which abounds with carbon, or the black earth from ditches will answer very well. Where manure is used, that of *hogs* is commonly preferred, and the older it is, the less liable it will be to give the plant a rank bitter taste. When the plants are about six inches high, they should be transplanted, by which they will gain strength. When of a tolerable size, they must be earthed up, taking care to leave out the top of the central stem, or heart as it is generally termed, above ground. Unless the autumn should prove very warm, the cellery will be excellent, and not run to seed.

To preserve this plant during the winter, it should be taken out of the trenches late in the autumn, and put in a warm sheltered spot leaning against a bank of earth, and covered with earth or leaves. The plants must not touch each other.]

CELLARS, in modern building, are the lowest rooms in a house; their ceilings are usually level with the surface of the ground, on which the house is built. They are also situated under the pavement before it, particularly in streets and squares.

On account of the great utility of cellars in preserving wines, ale, &c. various attempts have been made to prevent the generation of damp and noxious air, in subterraneous places: two of these merit particularly to be noticed. The first is that of M. WESTBECK *(in the Memoirs of the Royal Swedish Academy of the Sciences)*, who caused a vaulted cellar to be constructed, without stone or lime: instead of the former, he employed charcoal, placed in the manner of brick work; and, as a substitute for the latter, he used a cement, consisting of clay, kneaded with charcoal dust. These brittle materials were employed, because they attract no moisture, or acidity, either from the air, or earth; a circumstance which renders them even more durable than stone.

Another method, is that frequently practised in Germany, where the vaults are so constructed, that a canal, or passage of communication, is opened from the cellar to the principal chimney of the house. [A communication should be made between each cellar (where there are more than one), by means of an opening over or near the doors and next the ceiling, three feet long and one foot deep. A circulation of air would thereby be effected, and for security parallel iron bars may be placed in the openings.] By this means, the cellars may be continually ventilated, so as to expel the damp and noxious vapours, which are usually collected in them; while the draught of the chimney is, in a considerable degree, promoted.

The dangers arising from the sudden, or frequent inhalation of such air as is often generated in close, and damp cellars, have already been stated; together with the most proper method of obviating its deleterious effects. See AIR.

CEMENT, generally signifies any glutinous matter, capable of uniting and keeping substances in close cohesion. It principally denotes compositions employed for holding together broken glass, &c. For this purpose, the juice of garlic is recommended as exceedingly proper; for it is very strong; and, if the operation be performed with care, leaves very little or no mark. This is also effected, by a preparation of fresh cheese cut in thin slices, which should be boiled in different waters, and continually stirred: thus it is converted into a very tough and elastic mass, which will not incorporate with liquids. After being sprinkled with a little boiling water, and worked upon a hot stone, a small quantity of unslacked lime should be added, and the whole beat into the consistence of a paste. This composition will prove a strong and durable cement for wood, stone, earthen ware and glass: when thoroughly dry, it resists every effect of water.

There is a cement for joining *glass* and *china*, used in Germany, and which appears to be preferable to that above mentioned. It is prepared as follows: Take, by measure, two parts of litharge, one of unslacked lime, and one of flint glass; let each be separately reduced to the finest powder, and worked up into a paste with old

drying oil. Hochheimer asserts, that this compound is very durable, and acquires a greater degree of hardness, when immersed in water.

Another composition, which is successfully employed by the Germans, for cementing *wood*, is prepared from pitch, mixed with bullock's blood, linseed-oil, and turpentine. The whole of these must be put over a fire, in an iron pan, and as much brick-dust added as will make them of the consistence of a thin paste. The tub, or cask, to which this preparation is to be applied, must be perfectly dry before it is laid on; and the chinks or crevices filled up with tow, while the cement is warm. Some melt a due portion of colophony with the other liquids, previously to the adding of the brick-dust; by which means the composition is said to be much improved.

Cement, in building, is used to denote any kind of mortar, which is stronger than that usually employed. The cement commonly used, is either *cold* or *hot*. The former is the second above described, for cementing china, &c. which is sometimes, though seldom, resorted to in the erection of walls.

The *hot* cement, in general use, is made of resin, bees-wax, brick-dust, and chalk, boiled together. The bricks to be conjoined are heated, and rubbed together, with cement between them. If the assertion of foreign writers be well-founded, there is a much superior composition for cementing stones prepared on the Continent. It consists of eight parts of pitch, four of colophony, two of minium, or very fine litharge; two of white lead; and one of brick-dust, melted together. Sometimes, however, the following materials are substituted for those last mentioned: Take pure quartz, reduce it to a fine powder, by means of the same free-stone, to which it is to be applied: add one third part of unslacked lime, and work the whole into a paste with the whites of eggs, just before it is wanted. So effectual is this preparation, that in a few minutes it will acquire the compactness and solidity of iron.

A cement of tolerable firmness, may be obtained, by a mixture of gypsum and quick-lime, with the addition of water: this compound may prove of considerable service in making troughs for holding water, or lining small canals.

A cheap mortar, or cement, that will not crack, may also be procured, according to M. Wiegleb, by mixing three parts of the thin residuum after slacking the lime, with one of powdered gypsum; but he adds, that it can be used only in dry situations.

[Coarse cement for fastening handles in pestles, glass feet in electrical stools, &c. Rosin 2 parts, wax one part, thickened with very dry powdered brick-dust, or earthenware, and used hot.

Cement to join china. Powdered cheese, white of egg and powdered quick-lime, worked up together and used quickly.

Cement to join china by fire. Melt together two parts of borax and one of white siilcious sand. Pour them out, grind them into a fine powder, mix them up with a little glue water, and apply it with a hair pencil to the pieces of china to be joined: expose it to a heat just enough to melt this flux.

Willis's cement for broken retorts, even during the distillation of phosphorus. Dissolve 2 oz. of borax in a pint of water, thicken it

with sifted slacked lime, smear it on the crack with a spatula.

Cement or lute for distillation. Blood, quick-lime, and silicious sand, or quick-lime and size, or quick-lime and white of egg. Where you want it to come off easily, put but a small quantity of lime.

For the distillation of acid spirits. Size or blood thickened with Plaister of Paris and silicious sand in equal proportions: or in common cases, cloths smeared with white paint.

Cements for Derbyshire Spar and other stones. Melt seven or eight parts of resin and one of bees-wax together, with a small quantity of Plaister of Paris (gypsum). If it is wished to make the cement fill up the place of any chips that may have been lost, increase the quantity of Plaister. Knead the mass well, heat the broken pieces until they will melt the cement,and press them together, some of the cement being previously interposed.

Temporary cements. To fix glass plates to be ground for optical purposes, joining metallic plates to be turned in a lathe. Resin 4 oz. bees-wax $\frac{1}{4}$ oz. add 4 oz. of whitening made previously red hot.

Pitch, resin, and a very small quantity of tallow melted together, and thickened by stirring in dry brick-dust, is employed by chasers of gold and silver articles to support and hold their work.

Shell Lac is a very strong cement for holding metals, glass, or precious stones, while cutting, turning, or grinding them. The metal should be warmed.

White of eggs mixed with a little quicklime, (or a bit of chalk burnt in a common fire and powdered) makes a pretty good cement for glass and porcelain.

Gum Arabic dissolved in water, diluted with spirits: and gum ammoniac added, answers well for glass and porcelain.

Isinglass cements. Dissolve the isinglass in warm proof spirit: by adding one third gum ammoniac, previously to its solution in proof spirits, the cement is improved. Expose the mixture to a boiling heat until the isinglass and gum are dissolved, and until a drop of the composition becomes stiff instantly as it cools. When joined to broken china or glass, the pieces should be previously warm; then lay on the cement with a pencil, press the pieces together, binding them with a string.

Japanese cement, or rice glue. This elegant cement is made by mixing rice flour intimately with cold water, and then gently boiling it. Papers pasted together by means of this cement, will sooner separate in their own substance, than at the joining, which makes it extremely useful in the preparation of curious paper articles which require layers of paper to be cemented together. It is white, dries transparent, and is much preferable to flour paste. With this composition, made with a comparatively small quantity of water; models, busts, statues, &c. may be formed. When dry, the articles are susceptible of a high polish, and are very durable. The Japanese make quadrille-fish of this substance, which so nearly resemble those made of mother-of-pearl, that purchasers are often imposed upon.

A cement that resists moisture. Melt without water common glue, with half its weight of resin, to which add some red ochre. Useful for cementing hones to their frames.

Cement that hardens under wa-

ter. Mix clay and calces (oxides) of iron plentifully with oil, the mass will harden under water. Mr. Gad, Stockholm.

In Eton's Survey of the Turkish Empire, lately published in London, the following composition is mentioned as being in common use among the Turkish and Armenian Jewellers, to join glass or steel, or to fasten to watch cases, &c. a setting of jewellery.

"Dissolve five or six bits of mastic, as large as peas, in as much spirit of wine as will dissolve them: in another vessel dissolve as much isinglass (previously soaked in water till soft and swollen) in French brandy, as will make two ounces of strong glue; add two small bits of gum galbanum or gum ammoniacum, which must be rubbed till they are dissolved. Mix the whole together with a sufficient heat."

The process above described may be simplified by adding the gum ammoniac to the isinglass during its solution in proof spirits, and exposing the mixture to a boiling heat until it is dissolved, when the solution of mastic in alcohol may be added. The gum ammoniac previously dissolved with the isinglass, promotes the union of the mastic with the mucilage. This cement has been tried in London, and found to answer well: it stands against moisture.

A cement that will stand against boiling water, and even bear a considerable pressure of steam. In joining the flanches of iron cylinders and other hydraulic and steam engines, great inconvenience is often experienced from the want of a durable cement.

Boiled linseed oil, litharge, red and white lead, mixed together to a proper consistence, and applied on each side of a piece of flannel, previously shaped to fit the joint, and then interposed between the pieces before they are brought home (as the workmen term it) to their place by the screws or other fastenings employed, make a close joint.

The quantities of the ingredient may be varied without inconvenience, only taking care not to make the mass too thin with the oil. It is difficult in many cases instantly to make a good fitting of large pieces of iron work, which renders it necessary sometimes to join and separate the pieces repeatedly before a proper adjustment is obtained. When this is expected, the white lead ought to predominate in the mixture, as it dries much slower than the red. A workman knowing this fact can be at little loss in exercising his own discretion in regulating the quantities. It is safest to be on the side of the white lead, as the durability of the cement is no way injured thereby, only a longer time is required for it to dry and harden.

When the fittings will not admit easily of so thick a substance as flannel being interposed, linen may be substituted, or even paper or thin pasteboard; the only reason for employing any thing of the kind, being the convenience of handling.

This cement also answers well for joining broken stones however large. Cisterns built of square stones, put together with this cement will never break or want any repairs. In this case the stones need not be entirely bedded in it, an inch or even less of the edges that are to lie next the water need only be so treated: the rest of the joint may be filled with good lime.

Another cement that will stand the action of boiling water and steam. This cement which is preferable to the former for seam-engines, is prepared as follows:

Take 2 ounces of sal ammoniac, 1 ounce of flowers of sulphur, and 16 ounces of cast iron filings or borings. Mix all well together by rubbing them in a mortar, and keep the powder dry.

When the cement is wanted for use, take one part of the above powder, and twenty parts of clean iron borings or filings, and blend them intimately by grinding them in a mortar. Wet the compound with water, and when brought to a convenient consistence, apply it to the joint with a wooden or blunt iron spatula.

By a play of affinities which those who are at all acquainted with chemistry, will be at no loss to comprehend, a degree of action and reaction takes place among the ingredients, and between them and the iron surfaces, which at last causes the whole to unite as one mass. In fact, after a time, the mixture and the surfaces of the flanches become a species of pyrites (holding a very large proportion of iron), all the parts of which cohere strongly together.

Another cement of the same kind. Take two parts of flowers of sulphur, and one part of sal-ammoniac, and mix them together with a little water into a stiff paste.

Take also borings or turnings of cast iron in the state in which they are commonly found in the works where boring and turning are carried on, viz. mixed with sand, and sift them finely to get rid of the grosser particles. When the cement is wanted for use, dissolve a portion of the above paste in urine, or in water rendered slightly acidulous, and to the solution add a quantity of the sifted borings. This mixture, spread upon or between flanches of iron pipes, or put into the interstices of other parts of iron work, will in a little time become as hard as a stone.

Blood cement. A cement often used by coppersmiths to lay over the rivets and edges of the sheet of copper in large boilers, to serve as an additional security to the joinings and to secure cocks, &c. from leaking: is made by mixing pounded quicklime with oxen's blood. It must be applied fresh made, as it soon gets so hard as to be unfit for use.

We believe, if the properties of this cement were duly investigated, it would be found useful for many purposes to which it has never yet been applied. It is extremely cheap, and very durable.

For an account of the mode of making a cement for terraces; and of the use of liquid pitch to render them impenetrable to water, and secure from the attacks by frost, by C. PUYMARIN, see *Tilloch's Phil. Mag. Vol.* 13.

Cement for preserving wood and brick from decay, and for stopping leaks and fissures, by SILAS CONSTANT of New Jersey. The cement is composed of the following materials; viz. tar, pulverized coal (charcoal is esteemed the best) and fine well slacked lime; the coal and lime to be well mixed together, about four fifths coal one fifth lime; the tar to be heated, and, while hot, thickened with the mixture of coal and lime until it becomes so hard that it may be easily spread upon the surface of a board, and not run off when hot. Turpentine or pitch will answer nearly as well

as tar, and Plaister of Paris will answer instead of lime ; to be used in the same manner. The cement must be applied when warm, and is found to be used easiest with a trowel.

The following valuable composition for a cement for water cisterns, was given to the editor by captain Hunn who had used it with success. He lined the well with bricks, and left a space of about six inches between the bricks and the surrounding solid earth : this space he filled with mortar made of lime and pounded gravel: (probably covering the face of the pit with the hot mortar would answer.) Equal parts of pounded brick, sand and sifted stone lime, were well mixed and worked up with hot lime wash. This composition was spread on as *hot as possible* upon the inside of the well.

To prevent the cooling of the cement, only a gallon must be made at a time. A floor of the cement must be laid, and the top arched, leaving room for a pump to be put down.]

A peculiar kind of cement is prepared at Madras, with which most of the buildings erected in that Indian capital, are cemented. It consists of sand and lime, with the addition only of a small quantity of water, in which a proportion of coarse sugar has been previously dissolved. The quick-setting of this mortar, and the great hardness it acquires, can, as Dr. James Anderson has observed (in his *Recreations in Agriculture*, vol. i.), only be attributed to one of these two causes, namely, either the sugar added, or the quality of the lime-stone employed at Madras.... There are some kinds of lime-stone in Britain, which afford a much better mortar than others; and this also may be the case in India. Most calcareous earths are blended with sand and other particles, in various proportions; the quality of the mortar or cement will consequently vary, according to the nature of these different ingredients.

It has lately been discovered, that the scrapings of certain roads, consisting chiefly of levigated limestone, which is impregnated in a greater or less degree with the dung and urine of animals, form an excellent cement. For ordinary walls, these scrapings alone are frequently used; and, according to the account of Mr. Marshall (in his *Rural Economy of Gloucestershire)*, the proportion for the best building is about one part lime to three of those materials, collected from roads composed of limestone.

By the ingenuity of speculative men, however, several other modes of forming cements, have been contrived and successfully employed; but the enumeration of these would necessarily lead us to a greater length than our limits will permit. We shall, therefore, only give an account of the principal Patents lately granted for the invention of various cements.

The *first*, is that of Mr. John Worth, chemist, dated the 28th of May, 1771, now expired; for a "Preparation, or cement, for the purpose of preserving His Majesty's and other ships and vessels from worms, &c. and for various purposes in agriculture and commerce."....This composition consists of fourteen pounds of powdered or small pieces of resin ; twenty-eight of sand, sifted and washed clean from dirt or loam ;

three and a half of red lead; and one pound and three quarters of oil: the resin must be melted over a moderate fire, the sand and lead gradually put in, and then the oil; care being taken, when they are boiling, to stir them constantly till they become cold, so that the mass may be uniform. When there is occasion to use this cement, the quantity required must be broken into small pieces, and a pound of what is usually denominated by the chemists, *fat oil*, mixed with every twelve pounds of it. As soon as this is melted, it may be applied to the object intended, either by pouring it on, or by a brush, while boiling. The quantity of oil to be added to the cement must also be increased, or lessened, in proportion as the composition is required to be of a greater or less degree of hardness. or softness.

The *second*, was granted to Dr. HIGGINS, for his invention of a "Water cement or stucco for building, repairing, and plastering walls, &c." The component parts of this cement, are drift or quarry sand, cleansed by washing, and carefully strained from clay, salts, and calcareous, gypsous, or other grains less hard and durable than quartz; after which it is dried, either in the sun, or on an iron plate in a furnace, in the manner of a sand heat. [Sand from the Delaware only requires sifting.] To this must be added, fourteen pounds of the newest lime-stone that can be procured; and which heats most in slacking, and slacks soonest when duly watered; [which is fresh and closely kept.] dissolves in distilled vinegar with the least effervescence; leaves as little as possible of an insoluble residuum, and contains the smallest quantity of clay, gypsous or martial matter. This must be previously sifted in a brass wire sieve, as finely as possible, and slacked, by being repeatedly immersed in, and quickly drawn out of, a butt filled with soft water, till it be made to pass easily through the sieve; rejecting that part of the lime which is too coarse. The patentee directs to continue that process, till as many ounces have been passed through the sieve as there are quarts of water in the butt. The impregnated liquor, must stand in the vessel closely covered up, until it becomes clear, when it should be drawn off through wooden cocks, as fast and as low as the lime subsides; being now fit for use. Dr. HIGGINS nominates this solution, the *cementing liquor*. Fifty-six pounds of lime, prepared in the same manner as before, are next to be slacked, by gradually sprinkling on it the cementing liquor, in a close and clean place. The slacked part must be immediately sifted, and the lime, if not used instantly, kept in air-tight vessels; care being taken to reject those pieces which do not pass through the sieve. This richer lime, the Doctor calls *purified lime*. Bone-ash is then prepared, by grinding the whitest burnt bones, which must be sifted much finer than that commonly sold for making cupels. The principal materials being thus prepared, fifty-six pounds of the coarser sand, and forty-two of the fine sand, are to be mixed on a large plank of hard wood, placed horizontally, and spread so that it will stand to the height of six inches, with a flat surface on the plank. This must be wetted with the cementing liquor, and whatever superfluous quantities of it

will not incorporate with the sand, must flow off the plank. To the wetted sand are to be gradually added fourteen pounds of the purified lime, tempered in the same manner as fine mortar; with this composition are, by degrees, to be mixed fourteen pounds of the bone-ash, and the whole beaten quickly together; as the sooner, and more perfectly these materials are tempered together, and the quicker the cement thus formed is used, the better it will answer the purpose. This Dr. HIGGINS calls the *water cement coarse-grained*; it is to be applied in building, pointing, plastering, stuccoing, &c. in a similar manner with mortar; the principal difference being, that as cement is shorter, and dries much sooner than mortar, or common stucco, it ought to be worked expeditiously in all cases; and, in stuccoing, should be laid on by sliding the trowel upwards on it; and that the materials used with this cement in building, ought, when it is laid on, to be well moistened with the cementing liquor; which is also to be employed, if necessary, in wetting the cement, or reducing it to a fluid state. When such cement is required to be of the finer sort, ninety-eight pounds of the fine sand are directed to be wetted with the cementing liquor, and tempered with the purified lime and bone-ash, in the manner already described; with this only variation, that fifteen pounds of lime are to be used instead of fourteen, if the greatest part of the sand be as fine as Lynn sand. This is called *water cement fine-grained*, and is to be used in giving the last coating to, or finishing, any work intended to imitate the finer grained stones, or stucco: it may, nevertheless, be applied to all the uses of water cement coarse-grained, and in a similar manner. Whenever, for any of the above-mentioned purposes of pointing, building, &c. a coarser grained and cheaper sand is required, fifty-six pounds of the coarsest sand, or of fine rubble well washed, twenty-eight of the coarser, and fourteen pounds of the fine sand, are to be mixed together, and wetted with the cementing liquor, as above directed; to which fourteen pounds, or somewhat less, of the purified lime, and a similar quantity of the bone-ash, are to be added; and the whole tempered together in the manner already mentioned. When the cement is required to be white, colourless sand, lime, and the whitest bone-ash, are to be selected. Grey sand, and grey bone-ash, formed of half-burnt bones are to be chosen for making the cement grey. Other colours may be obtained, by employing coloured sand, or by mixing the necessary quantity of coloured talc in powder, vitreous or metallic powders, or other durable ingredients, usually employed in making paint. This water cement, whether coarse, or fine grained, may be used in forming artificial stone, by making alternate layers of cement, and of flint, hard stone, or brick, in the moulds of the intended stone, and by exposing the masses, thus formed, to the open air, in order to harden. When such cement is wanted for water-fences, two-thirds of the prescribed quantity of bone-ash are to be omitted, and an equal proportion of powdered tarras to be substituted: and if the sand be not of the coarsest sort, more tarras must be added, which should not exceed in weight one-sixth part of the former. When a cement of the finest

grain, and in a fluid form, is required, so that it may be applied with a brush, flint-powder, pounded quartz, or other hard, earthy substance, may be used, instead of sand, but in smaller quantity, and in proportion to the fineness of the flint, or other powder, so that it shall not amount to more than six times, nor less than four times, the weight of the lime. According to the greater, or smaller quantity of lime, the cement will be more or less liable to crack, by quick drying. Where the sand above described, cannot be conveniently procured, or, where it cannot be washed and sorted, that which bears the geatest resemblance to the mixture of coarse and fine sand, may be selected; provided due attention be paid to the quantity of lime, which is to be increased, when the sand is fine, and to be diminished, in proportion to its coarseness. In situations where sand cannot be procured, any durable stony body, or baked earth, grossly powdered, and sorted in a similar manner, may be substituted by measure, but not by weight, unless such gross powder be of the same specific gravity.....Sand may be cleansed from softer, lighter, and less durable matter, and from those particles which are too fine, by various methods, preferable in certain circumstances to that above described.

Water may be found naturally free from fixible gas, selenite, or clay; and may be employed instead of the cementing liquour; in which state, the water will not require so much lime for its preparation. Where stone-lime cannot be procured, chalk-lime, or shell-lime, which approaches nearer to stone-lime, may be substituted, in the manner above directed; with this exception, however, that fourteen pounds and a half of chalk-lime will be necessary, instead of fourteen pounds of stone-lime. The proportion of lime may, without inconvenience, be increased, when the cement, or stucco, is to be applied, where it is not liable to dry quickly: on the contrary, it may be lessened, and the deficiency supplied, with considerable advantage, by causing an additional quantity of the cementing liquor to soak gradually into the work, so that the calcareous matter of this liquor, and the elastic fluid attracted from the atmosphere, may fill and strengthen the workmanship. The powder of almost every well-dried, or burnt, animal matter, may be substituted for bone-ash, and several earthy powders, especially the micaceous, and the metallic, as well as calcareous ashes of mineral fuel, and the elixated ashes of various vegetables, the earth of which cannot, by burning, be converted into lime, will, in some measure, answer the purposes of bone-ash: in short, the quantity of the latter may be lessened, without injuring the cement, particularly in those circumstances which admit of a diminution of lime, and where the cement is not liable to dry quickly. For inside work, it will be very useful to mix hair with the cement.

The *last* patent, which we shall notice, was granted in November, 1800, to Mr. John Baptist Denize, chemist, for a cement, applicable to various purposes. The basis of this is *petroleum*, or rock-oil, in any form; in which a small portion of sulphur is dissolved, by melting; to which is added any kind of vitrescible, earthy matter,

such as clinkers, and *scoriæ*, from iron, or glass furnaces; puzzolane, or any volcanic ashes, &c. These are to be powdered, and stirred into the melted sulphur-oil, till the whole becomes of such a consistence as to be easily spread with a trowel, and does not adhere to the fingers, when cool. This cement is firm, durable, and impervious to moisture.

Those of our readers, who may be desirous of additional information, relative to this interesting subject, we refer to the translation of M. LORIOT'S "*Practical Essay on Cement and Artificial Stone*," (8vo. 1s, 6d. Cadell, 1774); and to Dr. HIGGIN'S "*Experiments and Observations, made with a view of Improving the Art of composing and applying Calcareous Cements, and of preparing Quick-lime, &c.* (8vo. 5s. Cadell, 1780); in which the matter is fully and ingeniously discussed. See MORTAR. [LIME.]

CEPHALIC, generally signifies whatever relates to the head. Hence those remedies that are given for disorders of that part, are denominated *cephalic medicines.* Under this description are comprehended cordials, and whatever tends to promote a free circulation of the blood through the brain. Thus cephalic snuff is taken with a view to remove pains in the head, by occasioning the patient to sneeze, and, in this manner, perhaps, giving vent to obstructions in the smaller vessels. Such is the imperfect theory of cephalic medicines; and, strictly speaking, we are possessed of no *specific* remedy for relieving a common head-ach, unless the cause from which it proceeds, can be ascertained. Of the multiplicity of circumstances which may operate to produce that complaint, and likewise of the most proper means of alleviating it, we shall endeavour to convince the reader, under the article HEAD-ACH.

Cerussa. See WHITE LEAD.

CHADLOCK. See CHARLOCK.

CHAFER, COCK-CHAFER, May-beetle, Jeffry Cock, or, in Norfolk, DOR, the *Scarabæus Melolontha*, L. is an insect belonging to a genus, which comprises eighty-seven species. It has, like all the rest, a pair of cases to its wings, of a reddish, brown colour, sprinkled with a whitish dust, which is easily separated. The necks of these insects are, in some years, covered with a red plate; in others, with a black; but they are distinct varieties. Their fore legs are very short, and thus better calculated for burrowing in the ground, to which they instinctively retreat.

Chafers are well known by the buzzing noise they make, in the evening, when rising in the air; but particularly for the irreparable mischief they occasion to the industrious cultivator; having been found, in some seasons, so numerous, as to consume every vegetable production. These pernicious vermin are generated from eggs, which the females usually deposit, about six inches deep in the ground. Three months after, the inclosed insects begin to break the shells, and crawl forth, in the form of small grubs, or maggots, which feed upon the roots of whatever vegetables they meet with. In this worm state, they continue for more than three or four years, devouring the roots of every plant they approach, and burrowing under the ground with the utmost celerity for food. At length, they exceed a walnut in size, being large, white, thick maggots, with red heads, which are most frequently found in

newly turned earth, and are much sought after by every species of birds. When largest, they are an inch and a half long, of a whitish, yellow colour, with bodies composed of twelve segments, or joints, on each side of which there are nine breathing holes, and three red feet. The head is larger in proportion to the body; of a reddish colour, with a forceps, or pincer before, and a semi-circular lip, with which they cut the roots of plants, and suck out their moisture. They have no eyes, but are furnished with two feelers, which serve to direct their motions under ground.

At the expiration of four years, these destructive insects prepare to emerge from their subterraneous abode. About the latter end of autumn, the grubs begin to perceive their transformation approaching; when they bury themselves deeper in the earth, sometimes even six feet below the surface, where they form capacious apartments, the walls of which become very smooth and shining, by the excretions of their bodies. Soon after, they begin to shorten themselves, to swell, and burst their last skin, preparatory to their change into a *chrysalis*. This appears at first to be of a yellowish colour, which gradually heightens, till at length it becomes almost red. Its external figure clearly displays the characters of the future winged insect, all the fore-parts being distinctly seen; while, behind, the animal seems as if wrapped in swaddling clothes.

In this state, the young Cock-chafer, or May-bug, continues for about three months longer; when, towards the beginning of January, the *aurelia* divests itself of all its impediments, and becomes a complete, winged insect. But it has not attained its natural health, strength, and appetite: unlike all other insects, which arrive at their state of perfection as soon as they become flies, the cock-chafer continues feeble and sickly. Its colour is much brighter than in the perfect animal; all its parts are soft, and its voracious nature appears suspended. In this state, it is frequently found, and is erroneously supposed by those who are ignorant of its real history, to be an old one, of the former season, which has buried itself during the winter, in order to re-visit the sun the ensuing summer. The fact is, the old one never survives the season, but perishes, in the same manner as every other species of insects, from the severity of the cold, during winter.

Towards the latter end of May, these insects burst from the earth, the first mild evening that invites them abroad; after having lived from four to five years under ground. They are then seen to emerge from their close confinement, no longer to live on roots, and imbibe only the moisture of the earth, but to choose the sweetest vegetables for their food, and to sip the evening dew. An attentive observer will, at that time of the year, see every path-way strewed with them; and, in warm evenings of May, myriads of them are buzzing along, flapping against every thing that impedes their flight. The heat of the mid-day sun, however, seems to be too powerful for their constitution; they, therefore, conceal themselves in clusters, under the foliage of shady trees, but particularly of the willow, which appears to be their most

favourite food, and which they seldom quit, till they have consumed all its verdure. In seasons favourable to their propagation, they are seen in an evening, in considerable swarms; their duration, however, is but short, as they never survive the summer. They begin to pair, soon after they have emerged from their subterraneous prison; and the female then carefully bores a hole in the ground, with an instrument for that purpose, with which she is furnished at her tail, and deposits her eggs there, generally to the number of sixty.

Destructive as these insects, in their worm state, are to vegetation, they would be still more so, were they not destroyed by birds, and more especially *rooks*, which devour them in great numbers. Half a century ago, they were so exceedingly numerous in the county of Norfolk, England, that they destroyed not only the verdure of the fields, but even the roots of vegetables. One farmer, in particular, was so much injured by them, in the year 1751, that he was unable to pay his rent. Many crops in that county were then almost ruined by the devastations these insects committed, in their worm state; and, when they took wing next season, trees and hedges were in many parishes, completely stripped of their leaves. At first, the people brushed them down with poles, swept them up, and burnt them. James Ebden, a Norfolk farmer, made oath, that he gathered *eighty bushels*; but their number did not seem much diminished, except in his fields. Neither the severest frosts in our climate, nor even water, will kill them; as, on being exposed to the sun and air, for a few hours, they will recover, and resume their former lively state. One of the best methods to be adopted for preventing their transformation, is, to plough up the land in thin furrows, to employ children to pack them up in baskets, and then to strew salt and quick-lime on the ground, and harrow it in.

We have but an imperfect knowledge of the nature and history of the insect, called by the French *Vinaigrieur*, and of other *scarabivorous* animals, to avail ourselves of their labours. This, however, is clear, that if such insects as devour grubs, should take possession of the soil where cock-chafers abound, they must, in a short time, destroy immense numbers of the latter; and as they have five successive seasons to prey on them, till they attain their perfect state, they may be entirely extirpated, before one fly can be produced.

It is a circumstance well known, that the whole of the *corvus*, or crow, and pie-tribes, are exceedingly fond of chafers, and particularly at a season when grain is scarce (*i. e.* from the end of seedtime to the beginning of harvest); they search for them with the utmost avidity. These sagacious birds, having observed that the leaves of such plants as are attacked by the grub, appear withered or drooping, during the day, they fly to them, dig for it with their strong bills, to the very root; and, if they do not find it, pull the plant itself out of the ground. It also frequently happens, that they mistake the drooping leaves of plants newly set, for those injured by grubs, and seize upon these; thus finding no prey, they strike their bills into the ground, at their roots, pull them up one after another, and, if not watched, do great mis-

chief. Strawberries are particularly liable to the depredations of the grub; hence, sometimes, whole fields of strawberry-plants are spoiled by the rooks, immediately after they have been set. To prevent such devastation, it is necessary to guard them, till their leaves assume an upright position.

This damage, however, is but trivial, when compared with the real benefit occasioned by the rooks picking these vermin out of both grass and corn land. Great care ought, therefore, to be taken not to disturb these birds, especially as in fallowed lands, where grubs generally abound, they are of infinite service. In this case, the land should be stirred with the plough as often as the weather will permit; for, if the rooks once find their way thither, they will not abandon the plough, unless driven away by violence; and each time the land is stirred, they will destroy multitudes of these vermin. Were this the only advantage to be derived from their destruction, it would amply compensate the farmer for the labour and expence bestowed upon it. Independently of the beneficial effect which this management produces on the fertility of fallow-land, it may frequently be attended with the destruction of a whole race of grubs, in the adjacent fields.

But, as this method is impracticable in gardens, recourse ought to be had to other expedients. Gardeners have observed that cabbages, cauliflowers, strawberries, and especially lettuces, are the favourite food of the grub. In order to destroy that pernicious insect, they plant a row of lettuces between the rows of strawberries, in which case the insect will preferably attack the former. Hence, they carefully examine the plants every day, walking along the rows with a trowel: wherever they observe leaves falling, they know their enemy is on the spot; immediately dig it up, and thus destroy the grub.

The whole race of these insects may probably be extirpated in stiff soils, by long continued rains, during the winter. For at that time, they having descended deep into the ground, the passage must be in some measure left open, so as to allow the water, if in abundance, to soak down to the bottom of their hole; which, in a retentive soil, it will fill, and, if continued a sufficient time, infallibly drown them. Wherever irrigation is employed for other purposes, the extermination of the grub may be effected by this method; and there are many situations, in which water may be commanded in quantities adequate to this important purpose. It is highly probable, that, if a stream of water could be spread over the surface of the grass-field, only for a few days, during any of the winter or spring months, all the grubs might be drowned in their holes: and as water is most abundant in that season, a very small stream might be so conducted, in different directions, as to inundate a large tract of ground. The benefit of one irrigation, thus managed, would be felt for five years. We therefore venture, with Dr. Anderson, to recommend this mode of destroying grubs, to those who have grass-lands infested with them; especially when they are intended to be converted into corn-land; for the injury done by grubs to the first crop, is often severely

felt. It might even be safely applied to orchards and wood-lands, provided that the water were not continued longer than is necessary to effect the destruction of the worms.

Having thus given a succinct analysis of the different methods of exterminating the cock-chafer, in its earlier stages of existence, suggested by native writers, we proceed to lay before our readers the latest discoveries made on the Continent, relative to this important subject.

The *Hamburgh Society for the Encouragement of the Arts and Useful Trades*, has published the following methods of destroying this voracious insect, as communicated by different authors:

1. In order to prevent the worm from changing into a chafer, it is advisable to intersect the fields with ditches: as this insect is continually creeping about, it penetrates through the sides of those trenches, falls into the water which they generally contain, and cannot extricate itself from that situation; but it is necessary to collect the worms every day; for they will serve as an excellent food for swine and poultry.

2. Take two ounces of oil (it is not stated what kind of oil) to every pailful of water, and sprinkle it on such places as are visited by the worm: or bury twenty small pots, at equal distances, from 8 to 10 inches deep, and each containing from 20 to 30 drops of sulphurated oil, or thick balsam of sulphur, the exhalation of which expels the insects.....This expedient, however, can be practised only in gardens.

3. Another correspondent suggests the frequent hoeing of plants, or ploughing of the soil in the months of June and July, in order to bruise the insect, or to expose it for the prey of birds. He also advises to pour boiling water on those less productive, or barren spots of meadows, which may be easily distinguished from others: this remedy, however, appears to us exceptionable: because *hot* water would at the same time injure the vegetating roots of grasses.

4. Previous to a shower of rain, the following powder strewed on the land has been found of great service: namely, two parts of pulverized quick-lime, two parts of sifted wood-ashes, and one part of pounded sulphur: the hepatic vapour disengaged from this mixture, on being moistened, is affirmed, to be effectual in destroying that pernicious grub.

5. The Rev. J. F. Mayer, an aged German clergyman, has in a separate essay on this subject (1786) published the following method of extirpating the cock-chafer: he found from long experience, that irrigation of the fields towards the latter end of May, or in June; alternate manuring of land with marl, street-dung, acrid and corrosive matters, such as quick-lime, gypsum, nitre, the ley of wood-ashes, and of tanners waste, &c. are the only practicable means of destroying that insect in a grub-state; besides which, he advises to drive a flock of sheep frequently over such land as has been much perforated by this insect; to water the meadows in spring; to sow red clover early in March, or (in Germany), as soon as the snow is melted on the soil; then to harrow in the seed, to cover it thinly with a mellow dung, and to repeat the sowing in the first three or four years, as occasion may require.

In the Memoirs of the Agricultural Society of Paris (for 1787, vol. iii.) the Marquis DE GOUFFIER has suggested a very simple, but, as he asserts, effectual remedy for preventing the depredations of this injurious grub, and consequently its progressive transformation into a chafer. He observed, namely, that *turf* or *peat ashes*, strewed on the fields, produced that desirable effect.

This pernicious family of insects may be effectually destroyed, while in the state of *grubs*, by encouraging the propagation of moles. For the discovery of this important fact, we are indebted to EDWARD JONES, Esq. who relates it in the 19th vol. of the "*Transactions of the Society for the Encouragement of Arts*," &c. He observes that, by protecting the race of moles, the cock-chafers have gradually decreased in his neighbourhood, so that they are now rarely seen on his estate; because the grubs afford a favourite food to those subterraneous little quadrupeds.

Uses of the Cock-chafer. Although this numerous and voracious insect is by no means calculated to compensate the hundredth part of the injury it inflicts on vegetables; yet we are inclined to think that, especially in a grub state, it might be more frequently employed for the feeding of poultry, than it is at present. Nor does it appear to us impracticable, to feed and fatten great numbers of swine with these chafers, if they were previously bruised, and mixed with such vegetables chopped, or cut small, as are eagerly eaten by hogs.

We shall farther communicate to artists, a curious fact lately published by M. BUSCH, a German writer. He informs us, that an uncommonly beautiful *brown colour*, of a reddish shade, for painting, may be easily obtained from the cock-chafer; this colour is said to be of superior lustre and delicacy to every other water-paint hitherto discovered. The colouring matter is found in the throat and stomach of the winged insect, and probably consists of its food, when changed into chyle. After separating the posterior part of the body, there appears to be a thin, white canal, or duct, which should be carefully opened, the juice oozing out, collected on a fine painter's pencil, and then deposited on a shell. Each chafer affords at least three drops of this juice, which may be employed without any farther preparation; and is not liable to fade, or spoil, by long keeping. The most proper time for performing this operation, is the evening, and before the chafers begin to swarm; because they will then be replete with nourishment.

CHAFFINCH, or *Fringilla cælebs*, L. a small beautiful bird, abounding in Britain, and in various parts of Europe: it is chiefly valued for the variety and melody of its song.

Chaffinches construct their nests in hedges and trees; where the females lay four or five dusky white eggs, spotted with deep purple; and produces three broods within a year....They are hardy birds, and will subsist on various seeds, but prefer chaff, whence they derive their name. These creatures, though seldom attacked with disease, are apt to be infested with lice, unless sprinkled with wine, every fortnight or oftener.....The Essex finches are generally allowed to be the best sort, both for the

continuance and diversity of their notes.

CHAFF, in husbandry, the husks of the corn separated from the grain, by screening or winnowing it. This term is also applied to the rind of corn, which in grinding it, produces the coarser part of the meal.

By treating corn in a manner similar to that practised by the Tartars with buck-weat, it may be easily deprived of its rind, or, in a manner, *blanched*; and the same effect may be produced by merely steeping it in water, and expressing the starch: but the husky part thus separated, cannot with propriety be called *chaff*, as it is in reality part of the grain. Nor do we think that *cut straw*, deserves that appellation; because it is a distinct part, or the stalk of the plant. For this reason, we shall delay the description of its properties, as well as the various machines invented for saving the labour of cutting straw by the hand.

Chaff-Cutter. See Straw-Cutter.

CHAIN, a series of rings, or round pieces of metal linked one into another: it is of various forms and sizes, and applied to different purposes.

Notwithstanding the general utility of this article, for almost every branch of extensive manufactures, we have but lately been furnished with a chain, so constructed as to become an effectual substitute for ropes, and in every respect as pliable, while it is far more durable. The metal rope, or chain, we allude to, is that invented by the ingenious William Hancock, of Birmingham; for which the Society for the Encouragement of Arts, Manufactures, and Commerce, in 1796, liberally granted him a premium of fifty guineas.

This chain is particularly useful in the working of coal and other mines, wells, &c. The common chains, it is well known, cannot be depended upon, and break in the welded parts, when overstrained. Such dangerous accidents cannot easily happen in the metal ropes, being woven together while cold, out of the strongest iron drawn into wire, about 3-eighths of an inch in diameter; and so tempered, that it is almost impossible to find in them a link of inferior quality. Hancock's chains will run as flexibly on the pulley as an hempen rope of two inches in diameter, manufactured of the best materials: they have been employed in several large iron works, and with the greatest success. Indeed, they deserve to be generally adopted; as thus a considerable saving would arise in the consumption of that valuable article, hemp; and an important new manufacture might be established, from one of our staple commodities. Viewed in a national light, we cannot but regret that the inventor's situation in life does not enable him to make this article for *ready sale:* we therefore presume to appeal to the statesman, and the patriot.

Chaffweed, the Small. See Bastard Pimpernell.

CHAIR, in general, an article of furniture contrived for the purpose of relieving the lower extremities from the incumbent weight of the body.

Chairs have been held in great estimation, in all ages and countries. But, instead of recording the flying chairs of the heathen gods and goddesses, or those great arm-

chairs in which, according to ancient custom, the successful candidates, after election, are carried through towns, by certain corporations in England, we shall confine our account to the plain house-chair......This useful contrivance, for which we are occasionally ridiculed by the more luxurious Orientals, consists, generally, of a *square* basis, supported by *four* posts, or legs. Although we are no advocates for innovation, and the quadrangular form appears to be the most eligible for strength and steadiness, yet in this instance, we venture to pronounce that it is not the most proper.

Square seats are liable to many objections, when considered with respect to their influence on the health of the aged, infirm, and especially persons afflicted with the piles, or troubled with *ascarides*.... For these, a round, or blunt, triangular form of a chair, resembling the shape of a saddle, would be far preferable, and more conducive to the alleviation of their complaints. The reason is obvious; because the thighs and legs, when compressed, occasion an additional irritation, on a part which is already in a preternatural state of excitement, or, perhaps, subject to chronic inflammation, as is frequently the case in the hemorrhoids. Nor do we advise those patients to accustom themselves to rest upon very soft cushions, or pillows, except such as are tightly stuffed with horse-hair, dry mosses, or chaff. Hence we are of opinion, that the studious and all those who are engaged in sedentary employments, if they regard their health and convenience, should employ either round, wooden chairs, slightly concave, or such as we have before ventured to suggest.

A Patent, we understand, has lately been granted to Mr. Butler, of Catherine-street, Strand, for his invention of a *chair-bed*, of peculiar construction: but, as we have not been favoured with its specification, we cannot communicate farther particulars.

Sedan-Chairs are vehicles, supported by poles, for carrying single persons at short distances in town; and borne by two men. Their number in the metropolis, allowed by act of parliament, is four hundred; and the fare to which the chairmen are legally entitled, ought not to exceed two-thirds of the rate fixed for a hackney-coach, driven to the same distance.

CHALDRON, is a dry English measure, generally used for sea-coal, and consisting of 36 bushels, filled up according to the sealed bushel kept at Guildhall, London. On ship-board, 21 chaldrons are allowed to the score; each of which should weigh 2000 pounds: hence a bushel of coals ought to weigh from 56 to 62lb.....See Bushel.

CHALK, *Creta*, is a white earth, abounding in Britain, France, Norway, and other parts of Europe, which is said to have been anciently dug chiefly in the island of Crete, whence it has received its name.

This substance is found most plentifully in the county of Kent, in England, on the sides of hills, which the workmen undermine to a certain depth: they then dig a trench at the top, as far distant from the edge as the mining extends at the bottom; then fill the trench with water, which soaks through during the night, when the whole mass falls down. In

other parts of the kingdom, it generally lies much deeper in the ground.

Chalk is of two kinds: hard, dry and firm, or soft and unctuous...... The former sort is the best calculated for burning into lime; but the latter furnishes the best manure for lands. Both these species, however, are an excellent manure for sandy soils, as they fill up the interstices, or pores, and give the land a degree of consistence, which adapts it for the purposes of vegetation, and totally exterminates that pernicious weed, the corn marygold, or yellow ox-eye, *Chrysanthemum segetum*, L. which abounds particularly in sandy soils. It has a very different effect on clayey ground; for, so far from rendering it more compact (which is too much so already), it insinuates itself into the small pores; and, by raising a fermentation, exposes the clay more to the operations of the frost, rain, sun, and air; by which means its too coherent particles are loosened, and it is reduced to a state of pulverization.

It is, however, a circumstance worthy of remark, that, although the Kentish chalk agrees extremely well with other clayey soils, yet, when laid on those lands in Kent, situated near the pits, it by no means answers the expectations of the farmer. This is probably owing to the Kentish clays partaking in some degree of the nature of chalk, which, therefore, has not so good an effect in Kent, as in other parts of England; the quality of the manure being nearly congenial with the soil. It also deserves to be noticed, that chalk, however excellent it may be in itself, when mixed with dung or any other manure, is so far from ameliorating the soil, that crops to be raised from it, receive no benefit whatever, and it totally loses its invigorating qualities.

Chalk easily imbibes water: hence masses of it are employed for drying precipitates, lakes, earthy powders that have been levigated with water, and other moist preparations. Its domestic uses for cleaning and polishing metallic or glass utensils, are well known; for which purposes it is pounded, and by washing it, cleared from whatever gritty particles it may contain, and then called *whiting*. It is also of considerable service on ship-board, when mixed in the proportion of half an ounce to a gallon of distilled sea-water, which may thus be sweetened, and kept perfectly fresh.

In medicine, chalk is reputed to be one of the most useful absorbents, and in this light only, deserves notice; as the astringent virtues, which some have attributed to it, are utterly unfounded, unless in so far as the earth is saturated with acid, in which combination it forms a saline concrete, that is manifestly astringent. Several years since, a person at Edinburgh pretended to have discovered a specific for curing every kind of those *erythematous* or inflammatory eruptions, which often attend the chronic erysipelas, or the rose, on the legs, merely by applying powdered chalk to the parts affected: and though we have had no experience of this remedy, it does not appear to us, as proper and safe as *hot flour*, the good effects of which, on such occasions, we have frequently witnessed.

CHALK LANDS are thus denominated, from their consisting principally of chalk, with a thin layer of mould, or soil over it. They are well calculated for the growth of

barley and wheat, and especially of oats, which will thrive well on any kind of chalky land, however indifferent. It naturally produces a small species of vetch, called the smooth podded tare, or tine tare, *Ervum tetraspermum*, L. together with poppies, May-weed, &c. Sainfoin, and hop-clover, will also succeed on these lands; and where they are of the better sort, the haresfoot trefoil, *Trifolium arvense*, L. will thrive. The best manure for this species of soil are, dung, old rags, and the dung left after folding sheep; a practice which is particularly useful here, and which, we hope, will become more general.

CHALYBEATE, in medicine, is an appellation given to any liquid, as wine or water, impregnated with particles of iron or steel.

Chalybeate medicines operate, like other preparations of iron, both as aperients and as astringents, the only difference being in degree..... They are likewise supposed to differ according to the nature of the acid united with the metal: thus, vegetable acids impart to them a detergent and aperient virtue...... when combined with the vitriolic acid, they operate on the first passages as powerful aperients; the nitrous acid renders them very styptic, and the muriatic produces the same effect, in the highest degree.

The use of chalybeates has, occasionally, been attended with great success, when united with cathartics, especially in cases of *chlorosis*, pains of the stomach, and palpitations of the heart; but we think it our duty to caution the reader against resorting indiscriminately to remedies which are extremely precarious for plethoric, or very irritable constitutions, and sometimes productive of dangerous effects. Hence females, in particular, ought never to take them, without proper advice.

CHAMBER, in building, a part of a lodging, or a partition of an apartment, usually intended for the accommodation of beds. We have already given a few directions for correcting a vitiated atmosphere, particularly that of *bed-chambers*, (see AIR, and BED-ROOM); so that we may conclude this article with a short account of a curious mode of *cooling* the air in rooms, frequently practised by the Germans.

In the hot days of summer, especially in houses exposed to the meridian sun, a capacious vessel filled with cold water is placed in the middle of a room; and a few green branches (or as many as it will hold), of a vigorous lime, birch, or willow-tree, are plunged with their lower ends into the fluid. By this easy expedient, the apartment will, in a short time, be rendered much cooler; as the evaporation of water produces this desirable effect, in sultry weather, without any detriment to health. Besides, there can be no doubt, that the exhalation of green plants, under the influence of the solar rays, greatly tends to *purify* the air; and consequently deserves every attention of persons liable to pulmonary, or other complaints, in which the organs of respiration are affected.

CHAMOMILE, *Anthemis*, L. a genus of plants comprising 21 species: of these, five only are indigenous in England; the principal of which are the three following:

1. The *nobilis*, or common chamomile, also called sweet scented, or Roman chamomile, growing in sunny meadows and pastures, most plentifully in Cornwall, and also in

other parts of England. Its creeping stalks shoot forth branches, and these again strike root: the leaves and flowers have a strong, though not ungrateful, aromatic smell, and a bitter, nauseous taste. They afford an essential oil. An infusion of the flowers taken luke-warm, is anti-spasmodic; and cold, a stomachic. In large quantities the former is apt to excite vomiting. Dr. WITHERING asserts that the powdered flowers have cured agues, even when bark had failed, but ought to be taken in considerable doses; we suppose from one to two drams every other hour, to be repeated six or eight times during the remission of the paroxism. Both the leaves and flowers of the chamomile possess remarkable antiseptic properties, and are therefore used in fomentations, and poultices. From their antispasmodic powers, they are frequently found to relieve pain, especially in complaints of the kidneys, and in childbed.

2. The *Cotula*, fetid chamomile, May-weed, or Mathen; which grows in corn-fields, on road sides, and borders of dung-hills: it is a troublesome weed in tilled lands, very ungrateful and disagreeable to bees, and not relished by either horses, cows, sheep, goats, or swine; but toads are said to be fond of it. By its uncommon acrimony, it frequently blisters the skin of reapers. Notwithstanding its very pungent taste, it has often been used with advantage in diseases peculiar to females.....BECHSTEIN.

In dyeing, a decoction of the whole plant, when in flower, imparted a *permanent* citron colour to wool prepared in a solution of bismuth.....DAMBOURNEY.

3. The *tinctoria*, or ox-eye chamomile, grows on high sunny pastures, but is rarely to be met with in Britain. Mr. DICKSON found it in Essex. Formerly, it was discovered by RAY, on a bank near the river Tees, not far from Sugburn, Durham. This plant has doubly winged, serrated leaves, cottony underneath, and its stem supports a *corymbus*, or flowers progressively standing each on a proper fruit stalk; attains the height of about eighteen inches; spreads out its branches, and bears yellow blossoms in July and August. It is eaten by horses and goats; but not fondly by sheep, and refused by cows and swine.

The flowers of the yellow ox-eye afford a remarkably clear and good yellow dye....WITHERING....If the root of nettles and a little alum be boiled together with this plant, a most beautiful yellow may be given to wool......LINNAEUS......None of these colours, however, is permanent.....DAMBOURNEY.

CHAMOMILE, the Wild. See Common FEVERFEW.

CHAPS, are flaws or cracks which appear on the skin, and are induced by various circumstances.

Chaps in the face generally proceed from the action of external cold; which, by impeding the perspiration of this part, or contracting the fibres unequally, causes them to be drawn asunder; so that a fissure succeeds, which produces very uneasy sensations; and is often attended with acute pain. In order to prevent or remove such chaps, the face ought never to be *suddenly* exposed to the cold air, after leaving the fire-side, or a warm room: nor should such part be washed with common soap. Previously to retiring to bed, it may be anointed

with *unscented* pomatum, which should not be removed till the following morning; or honey-water may be preferably applied, and suffered to dry; care being taken to cleanse the part from dust and other impurities.

Chaps in the lips, frequently arise from the same cause as those of the face; though the former sometimes occur in scrophulous habits, or are occasioned by acrid humours settling on the part affected; in consequence of which the lips are apt to swell on each side of the wounded spot. When the complaint is attributed to cold, the treatment above stated will generally effect a cure: in scrophulous cases, a course of medicine, adapted to the nature of that disease, can alone remove the external affection. But, where acrid humours are the immediate cause, it will be proper to procure medical advice......The following salve may, in the opinion of Dr. SHAW, be advantageously applied to the lips, in either of the cases above specified: Let 2 scruples of the bark of alkanet, and $1\frac{1}{2}$ oz. of oil of sweet almonds, be simmered together over a gentle fire; then strain the liquor; add 3 drams of white wax, 1 dram of spermaceti; and 1 scruple of the expressed oil of mace; when the whole should be formed into an ointment.

Lastly, if *chaps in the hands* originate from SCROPHULA, the treatment suggested for similar affections of the LIPS may be advantageously adopted; but, where they are occasioned either by cold, the use of hard water, or of soap containing quick-lime, the hands may be anointed with the fat of geese. Should, however, such fissures extend to a considerable depth, and be very difficult to heal, it will be proper to apply digestive ointment, and to treat them as simple wounds.

CHARCOAL, or *Carbon* of the French chemists, a sort of artificial coal, or fuel, consisting of half-burnt wood. It is chiefly used, where a clear and strong fire without smoke is required; for the humidity of the wood is dissipated by the fire in which it was prepared.

The art of making charcoal is very ancient; for even SOLOMON (Proverbs xxvi. 21), distinguishes that kind of fuel from common fire-wood. Among the Romans, it was held in great estimation, and ÆMILIUS SCAURUS, the conqueror of the Ligurians, was a charcoal-merchant. PLINY describes the piles of wood erected by the manufacturers of this article, and observes that the blocks ought to be placed in a pyramidal form, coated with clay, and a hole left on the top for conducting the smoke, when the wood is set on fire. Thus, it would be unnecessary to describe the process, for those who employ themselves in the preparation of this article.

Properties. A surprizing number of pores have, by the microscope, been discovered in charcoal. Dr. HOEK counted, in the 18th part of an inch, 150, so that in a piece of an inch in diameter, there will be upwards of five millions. To this circumstance must be ascribed the blackness of charcoal, as the rays of light striking on it, are received and absorbed by its pores, instead of being reflected; consequently, the body of coal appears black....a colour arising from the want of reflection.

Charcoal may be preserved to an indefinite length of time, and in the ancient tombs of northern nations, entire pieces are frequently discovered. It is, therefore, deserving

the attention of those, who wish to preserve valuable records from the "destructive tooth of time;" for there yet exists, according to DODART, charcoal made of corn (probably in the days of CÆSAR), which is in so complete a state, that the wheat may be distinguished from the rye.

This substance is not soluble in any of the acids, but may be dissolved in considerable quantities, by plunging it in a solution of the liver of sulphur, to which it imparts a green colour. Melted with colourless frits, or glasses, it gives a pale, dark yellow, reddish, brownish, or blackish colour, accordingly as the inflammable matter is in greater or less proportion. Fresh charcoal made of wood strongly attracts the air, and will absorb it for a considerable time; but Dr. PRIESTLEY uniformly observed, that, after submitting it to distillation, the expelled air was less pure than that of the atmosphere, and part of it was *fixed air*. Hence it may occasionally be employed in a *dry* and *powdered* state, for damp and foul habitations. Lastly, Dr. PRIESTLEY has discovered that several of the metals, such as copper, iron, silver, &c. may be converted into charcoal, by passing the steam of either spirit of wine or turpentine, over them when red hot; and this, by way of distinction, he calls the *charcoal of metals*. As charcoal has been separated from the purest spirit of wine in the process of making æther, M. LAVOISIER is of opinion, that it is one of the constituent parts, or elements, of that volatile liquid.

Uses. Besides the great advantage which charcoal affords to the artist and manufacturer, it has lately been employed with considerable success, 1. In correcting the burnt or empyreumatic taste of ardent spirits; 2. In depriving rancid oil of its disagreeable flavour; and 3. In restoring putrid meat. For these useful purposes, however, it is fit only when kept in close vessels immediately after it has been prepared, so that it may absorb no acidity, or fixed air, from the common atmosphere. When employed in the two first-mentioned cases, it should be previously reduced to powder, a very large quantity of which is required for the rectification of distilled liquor; but a smaller proportion, for purifying animal or vegetable oil, so that even the common train-oil may be rendered fit for being burnt in chamber-lamps. Several manufactories of this description have lately been established in the vicinity of London, of which we shall only mention that carried on by Mr. JOSHUA COLLIER, of Southwark.

From the great attraction which charcoal possesses for any kind of oily matter, or for that invisible something, formerly called *phlogiston*, it is excellently adapted to become an extensively useful agent in various branches of the arts...... We shall therefore communicate the following abstract of the late discoveries made on this subject, chiefly by Prof. LOWITZ, of St. Petersburgh, [in 1786.] This philosopher found, that charcoal rendered the crystals of tartar very white and pure, when employed in preparing them; that the marine and nitrous acids are decomposed by being distilled upon it; that the red juices of vegetable fruits are deprived of their colour, without losing part of their acidity; that brown, rancid oils are rendered sweet and clear, by agitating them

for some days with charcoal in powder; that it changes the smell of putrid vegetables to that of a pure volatile alkali, and produces the same effect on fresh meat. By boiling coals in powder, with honey, the pure saccharine parts of the latter are said to be separated, and the honey to become a well-tasted sugar. Vinegar concentrated by freezing, and distilled from a large portion of powdered coal, is extremely strong, pure, and fragrant. Corn-spirit, merely shaken with coal, loses its bad flavour; and, if honey be added, it becomes a sweet and pleasant liquor. Even the tainted flavour of ardent spirits, when impregnated with any vegetable oils, may in a similar manner be destroyed; and, if the spirit be distilled, the residuum is said not to be brown; so that no inconvenience will arise from carrying the distillation too far. These effects were produced by every kind of coal, whether fossil or charred vegetable substances; though the latter appear to us, in many respects, preferable to coke.

[Charcoal is of the greatest utility in purifying water on shipboard. The most offensive water may be rendered perfectly sweet by merely filtering it through sponge, maple, hickory, or oak charcoal, and sand. A simple apparatus for performing this operation, shall be described under the article FILTER. Casks charred on the inside will preserve water a long time sweet; but it would seem to be a preferable mode (where practicable), to permit the water to undergo the usual fermentation, and then draw it off into the charred casks. See also FENCE, CUCUMBER, MELON.]

There are considerable differences in the coals of various vegetables, with respect to their habitude to fire: the very light coals of linen, cotton, some fungi, &c. quickly catch fire from a spark, and soon consume: the more dense ones of woods, and roots, are set on fire with greater difficulty, and burn more slowly; the coals of the black berry-bearing alder, of the hazel, willow, lime-tree, and maple, are the most proper for making gunpowder, and other pyrotechnical compositions. For the reduction of metallic calces, those of heavier wood, as oak and beech, are preferable; because these appear to contain a larger proportion of the inflammable principle, and perhaps in a more fixed state. Considered as common fuel, those of the heavy woods afford the greatest heat, and require a most abundant supply of air, in order to keep them burning; on the contrary, the coals of the light woods retain a glowing heat, till they are consumed, without a strong draught of air; the bark usually crackles while burning, which is seldom the case with the coal of the wood itself.

Charcoal is likewise of considerable service to different artists, for polishing brass and copper-plates, after they have been rubbed clean with powdered pumice stone. Horn plates may be polished in a similar manner, and a gloss afterwards given them with tripoli. Coals of different substances are also used as pigments; hence the bone and ivory-black of the shops. Most paints of this kind are not only incorruptible, but also possess the advantage of full colour, and work freely in all the forms, where powdery pigments are employed; but they ought to be carefully prepared, by thoroughly burning the substance in a close vessel, and after-

wards reducing the coal to a fine powder....In drawing outlines, the artist avails himself of pieces of charcoal, the marks of which may be easily rubbed out. For this purpose, the smaller branches of a tree, such as the willow and vine, are usually preferred; and which, after being freed from the bark and pith, afford the best drawing pencils..... Dr. LEWIS remarks, that the shells and stones of fruit yielded coals, so hard that they would with difficulty mark on paper, while those of the kernels of fruit were very soft and mellow. All these experiments must be conducted in proper vesels, closely covered (the barrels of old guns, or pistols, may occasionally serve as substitutes). The Doctor levigated various coals into fine powder, mixed them with gum-water and oil, and applied them as paints, diluted with different degrees of white. When laid on thick, they all appeared of a strong, full black; nor could it be discerned, that one was of a finer colour than another; but those diluted with white, or spread thin, had a blueish cast....Horns, and the bones, both of fish and land animals, produced coals more glossy, and of a deeper colour, than vegetables; and which in general were so hard that paper could scarcely be stained with them: but silk, wool, leather, blood, and the fleshy parts of animals, yielded soft coals. Some of these remarkably differed from others, in colour; that of ivory being superior to all, and doubtless the finest of black produced by fire.

In agriculture, charcoal has, in many parts of France and the Netherlands, been substituted for turf-ashes, as a manure.

[The utility of charcoal (oxyd of carbon) as a manure, has often been mentioned by practical writers, but was not much regarded until Mr. KIRWAN called the attention of chemists to the subject. Mr. Deane says, that he had long observed the great fertility of lands near to where coal kilns were burnt, and quotes the *Complete Farmer* for a confirmation of the fact. Carbon is now known to be one of the most universal materials of nature. The whole atmosphere contains always a quantity of it in the form of carbonic acid. It also exists in *lime-stone* in the same form, and in the black earth left by the decomposition of vegetable and animal bodies. Morasses too, consist principally of the carbonic recrements of vegetable matter.

By what means this solid substance is rendered fluid, so as to be capable of entering the fine mouths of vegetable absorbents, is not yet decided by chemists. The present opinions on the subject, will be noticed under the article MANURES. It is, however, sufficient for the practical man to be assured of the fact, that he will derive much benefit from strewing charcoal on his land.

Charcoal prepared from maple wood, and finely powdered, makes a simple, efficacious, and safe tooth-powder, and ought to be preferred to any other. The way to prepare charcoal in the nicest manner, is to cut the wood in small billets, and distil them in an iron cylinder, having a tube fixed to one end, to permit the free exit of the smoke and water, which are retained in the common process of charring wood, and tend to render the product impure, and of a disagreeable taste. When no more smoke or water escape from the tube, put out the fire, and close the mouth

with clay until the cylinder cools, or the pieces of wood may be put in a pot not closely covered, and surrounded with live coals, until all smoke from the pot shall cease. Then remove the coals, and closely lute the cover with clay until the pot cools....then powder the charcoal.

Meat which has been kept too long in summer, may be deprived of its bad smell by putting it in water, and throwing into the pot, when beginning to boil, a shovel full of live coals, destitute of smoke; after a few minutes have elapsed, the water must be changed, when the operation, if necessary, may be repeated.

It is probable that meat surrounded by fresh charcoal would keep for months.

Mr. MUSHET of the Carron Iron works, observes, that charcoal is preferable to coke for the manufactory of iron, owing to the superior quantity of unalloyed carbon it affords to the iron. A determinate quantity of charcoal by measure, will smelt and convey principle to three times the quantity of iron, that can be done by the same measure of pit coal. In the refinery way, it is peculiarly preferable.

An engineer of considerable merit states, that in this respect it is superior to coke in the proportion of 7 to 12.

Charcoal is one of the greatest non-conductors of heat. This quality renders it applicable to a variety of economical purposes. See FIRE-PLACES, KITCHEN, LAMP.]

Besides these various purposes to which charcoal is daily applied, it also promises to be of considerable service in medicine; on account of its absorbent and antiseptic properties. (See BREATH.) From a late account given by Dr. METZLER, an eminent physician in Germany, we learn the following extraordinary fact: The corpse of a person that had been murdered twelve days, was brought before a coroner's inquest; and, contrary to the expectation of the court, there was not the least mark of putrefaction, nor any offensive smell perceptible. On opening the intestines of the abdomen, they were found in an unusual dry state....... The cause of this phenomenon was soon discovered; for it appeared in the course of examination, that the body had been kept for the whole time buried in dry coals, coarsely pounded, at least twelve inches deep. It was still more remarkable, "that the cartaligenous parts, especially those of the breast, had acquired a degree of softness, resembling that of butter."..... We submit the application of this singular property to the discernment of our readers.

With regard to the treatment of persons suffocated by the deleterious vapour of charcoal, we shall in this place only observe, that a body in that unfortunate situation, ought to be without delay exposed to the strongest draught of cold air; all the garments loosened; volatile spirits held to the nostrils; the body rubbed either with vinegar, or with a diluted spirit of sal ammoniac; the face should be turned towards the ground, and the head, breast, back, &c. either washed with, or the whole body suddenly plunged into, cold water; then dried, and again washed with vinegar; stimulating clysters repeatedly administered, and venesection performed at the jugular vein, or, for want of medical assistance, a number of

leeches applied to the neck and temples......Of the particular circumstances connected with this treatment, we propose to give a more detailed account, under the head of SUFFOCATION.

CHARITY is one of the cardinal virtues of mankind, displayed chiefly in the spontaneous habit and disposition, of supplying the wants of others, whether with money, counsel, assistance, &c. Pecuniary relief, being generally regarded as the most efficacious, it merits some attention, at a time when we are most inclined to excuse ourselves from affording it to the needy. Hence, we propose to impart a few miscellaneous hints, supplementary to those we have already given, under the articles ALMS, and BEGGARS.

We cannot but reprehend the selfish principle of such modern philanthropists as practise, systematically, the trite, but prevailing, adage, that "charity begins at home." For, though in the dispensation of alms, we may find it, perhaps, altogether impossible to avoid giving charity to some undeserving persons, yet it is a duty incumbent upon every good man, to bestow it at all times, without deeply entering into the merits of the question, and carefully to shun every species of ostentation. It may, indeed, be objected, that the pressure of the times is such as to preclude, in many well-disposed individuals, the ability of contributing their mite towards the relief of distressed objects; having, perhaps, large families to maintain, as well as heavy taxes and poor-rates to defray; yet we venture to reply, that prudence and frugality will always enable them to adjust their domestic economy; so that, after satisfying every natural and legal demand, they may have a small overplus to spare, for the assistance of those who are destitute of human aid.

There are many other objections to the *indiscriminate* giving of charity, which our limits will not permit us to discuss: and though it may appear a bold assertion, yet we pledge ourselves for the truth of it; namely, that it is *chiefly* pride and indolence, or some other equally disgraceful motive, which keeps the one half of the world in a state of ignorance, with respect to the wants, distresses, and sufferings of the other.

CHARLOCK, WILD-MUSTARD, CHADLOCK, or CORN-CALE, the *Sinapis arvensis*, L. an indigenous *British* plant, which grows in corn and turnip fields. It is a very noxious weed, especially among turnips, to which it bears so great a resemblance, that it is said, instances have occurred, of *hoers* taking up a whole crop of turnips, and leaving the charlock. To obviate this evil, it has been recommended to turn a flock of sheep into a field abounding with this weed; for, during the early period of its growth, they will prefer it to the crop. Some lands are exceedingly liable to be overrun with the charlock, particularly when they have been manured with cow-dung alone, as that is very favourable to its growth. Experienced farmers, in general, are so well convinced of this effect, that they always mix horse-dung with that of cows, for manuring arable land. When barley is infested with charlock, to such a degree as to endanger the crop, that weed has been mowed down with success in the month of May, while in flower; but care should be taken

to cut of, at the same time, the tops of the barley leaves. Thus, the latter will shoot up above the weed, and it is a remarkable fact, that *four quarters* of grain have been obtained from such land as, without this expedient, would have been almost unproductive.

The most effectual method of extirpating the charlock is, to sow arable land with grass-seeds, and thus convert it into pasture; because the former never grows where a coat of grass covers the ground.

When this plant arrives at maturity, it produces yellow flowers, and turgid, angular pods, containing seed, which is commonly sold under the name of *Durham mustard seed.*

In Ireland, and the northern parts of Europe, this plant is boiled, and eaten in the same manner as cabbage. It is also relished by cows, goats, and swine; sheep are extremely fond of it; but it is generally refused by horses. Bees derive much nourishment from its flowers.

Instead of being spuriously vended for *Durham mustard*, the seeds of this plant might be rendered more profitable, by expressing the excellent oil with which they abound. This has been attempted with success, in Germany; for we are informed by BECHSTEIN, that he obtained thirty pounds of pure lamp-oil, from one hundred pounds weight of the seed.

CHARLOCK, the *Jointed*, or *White flowered.* See Wild RADISH.

[CHELIDONIUM, *Celandine*, or *Horned Poppy*. There are two species of this genus indigenous in the U. S. 1. C. majus, greater, or common Celandine. The juice of the plant is extremely acrid. It is a common remedy for warts, and it is said will cure the itch, tetters, and ring-worms.] From the Saffron coloured juice of the greater Celandine, no *permanent* colour could be obtained; but Rossig a reputable German author, says, that the whole plant produced by fermentation, a good blue colour, similar to that obtained from *woad* or the *Isatis tinctoria* L. a fact well deserving the attention of dyers.

[2 C. GLAUCIUM, Sea Celandine, yellow horned poppy. This plant is very ornamental to sandy shores, but poisonous.]

CHEESE, a species of solid food, prepared from curdled milk cleared of the whey, and afterwards dried for use. As this article constitutes a material part of domestic consumption, we find in almost every country, one or more places celebrated for the superior quality of their cheese. Hence, we propose to enumerate the principal sorts of this manufacture, both at home and abroad; introducing also an account of the mode in which they are prepared.

I. STILTON CHEESE is produced in the town of that name, in the county of Huntingdon; and from its peculiar richness, and flavour, is sometimes called *English Parmesan.* The process of making it is as follows: the night's cream is put to the morning's milk, with the rennet; when the curd *is come*, it is not broken, as is usually done with other cheese, but taken out whole, and put into a sieve, in order to drain gradually. While draining, it is pressed till it becomes firm and dry; when it is placed in a wooden hoop, or box, made to fit it, as it is so extremely rich, that without this precaution, it would be apt to separate. It is

afterwards kept on dry boards, and turned daily, with cloth binders round it, which are tightened as occasion requires. After being taken out of the hoop, the cheese is closely bound with cloths, which are changed every day, till it acquires sufficient firmness to support itself: when these cloths are removed, each cheese is rubbed over daily, for two or three months, with a brush; and, if the weather be damp, or moist, twice a-day: the tops and bottoms are treated in a similar manner every day, even before the cloths are taken off.

Stilton cheese is sometimes made in nets, resembling cabbage nets; but these are neither so good, nor so richly flavoured, as those prepared in the manner before described.

Although the Stilton farmers are in much repute for their cleanliness, they take but little pains with the rennet; as they, in general, cut small pieces from the *vell* or *maw*, that are put into the milk; and, being gently agitated with the hand, break, or turn it, so that the curd is easily obtained. We venture, however, to say, that their valuable cheese might be improved, and few broken ones occur, if they would prepare the rennet in the manner adopted in the west of England; namely, by keeping the vell, maw, or *rennet-bag* (as it is differently called), perfectly sweet and fresh; for, if it be in the least degree tainted, the cheese will never acquire a fine flavour. When the vell, or maw, is fit for the purpose, a strong solution of salt should be made, with two quarts of soft, sweet, water, into which are to be introduced sweet briar, rose leaves, and flowers, cinnamon, mace, cloves, and, in short, almost every kind of spice and aromatics, that can be procured. The whole must boil gently, till the liquor is reduced to three pints, and care should be taken that it be not smoked. The spices should next be strained clean, and the liquid, when milk warm, poured upon the vell, or maw. A lemon may then be sliced into it, and the whole stand at rest for a day or two; after which it should be again strained, and bottled. Thus, if well corked, it will keep good for twelve months, or longer, possess a fine aromatic odour, and impart an agreeable flavour to the cheese.

II. Cheshire Cheese is prepared in the following way: The evening's milk is not touched till the next morning, when the cream is taken off, and put to warm in a brass pan, heated with boiling water: one-third part of that milk is heated in a similar manner. The cows being milked early in the morning, the new milk, and that of the preceding night, thus prepared, are poured into a large tub, together with the cream. A piece of rennet, kept in luke-warm water, since the preceding evening, is put into the tub, in order to coagulate the milk; with which, if the cheese is intended to be coloured, a small quantity of *arnotto* (or of an infusion of marigolds, or carrots), is rubbed fine and mixed; the whole is stirred together, and, being covered up warm, allowed to stand about half an hour, or till it is coagulated; when it is first turned over with a bowl, to separate the whey from the curds, and broken soon after into very small particles: the whey being separated, by standing some time, is taken from the curd, which sinks to the bottom, and is then collected into a part of the tub, pro-

vided with a slip, or loose board, to cross the diameter of the bottom, for the sole purpose of effecting this separation: on which a board is placed, weighing from 60, to 120 pounds, in order to press out the whey. As soon as it acquires a greater degree of solidity, it is cut into slices, and turned over several times, to extract all the whey, and again pressed with weights: these operations may consume about an hour and a half. It is then taken from the tub, and broken very small by the hand, salted, and put into a cheese vat, the depth of which is enlarged by a tin hoop fitted to the top. The side is then strongly pressed, both by hand, and with a board at the top, well weighted; and wooden skewers are placed round the cheese, at the centre, which are frequently drawn out. It is then shifted out of the vat, a cloth being previously put on the top of it, and reversed on the cloth into another vat, or again into the same, if well scalded, before the cheese be returned to it. The top or upper part, is next broken by the hand, down to the middle, salted, pressed, weighted, and skewered, as before, till all the whey is extracted. This being done, the cheese is again reversed into another vat, likewise warmed, with a cloth under it, and a tin hoop, or binder, put round the upper edge of the cheese, and within the sides of the vat; the former being previously inclosed in a cloth, and its edges put within the vessel. These various operations are performed from about seven o'clock in the morning till one at noon. The pressing of the cheese requires about eight hours more, as it must be twice turned in the vat, round which thin wire skewers are passed, and shifted occasionally. The next morning it ought to be turned, and pressed again, as likewise at night, and on the succeeding day; about the middle of which it is removed to the salting room, where the outside is salted, and a cloth binder tied round it. After this process, the cheese is turned twice daily, for six or seven days; then left two or three days to dry, during which time, it is once turned, and cleaned every day; and at length deposited in the common cheese-room, on a boarded floor, covered with straw, where it is turned daily, till it acquires sufficient hardness. The room should be of a moderate warmth, but no wind, or draught of air, must be permitted to enter, as this generally cracks the cheese. The outsides, or rinds of them, are sometimes rubbed with butter, or oil, in order to give them a coat.

III. Gloucester Cheese is made of milk immediately from the cow; but which, in summer, is thought too hot, and is, therefore, lowered to the requisite degree of heat, before the rennet is added, by pouring in skim-milk, or, if that will not answer, by the addition of water. As soon as the curd "is come," it is broken with a double cheese knife, and also with the hand, in order to clear it from the whey, which is laded off. The curd, being thus freed from the principal part of the whey, is put into vats, which are set in the press for ten or fifteen minutes, in order to extract all the remaining liquid. It is then turned out of the vats into the cheese tubs again; broken small, and scalded with a pailful of water, lowered with whey, about three parts of water to one of whey; and the whole is briskly agitated,

the curd and water being equally mixed together. After having stood a few minutes, to let the curd subside, the liquor is poured off; and the former collected into a vat, the surface of which is, when about half full, sprinkled, with a little salt, that is worked in among the curd. The vat is then filled up, and the whole mass turned two or three times in it, the edges being pared, and the middle rounded up at each turning. At length, the curd is put into a cloth, and placed in the press, whence it is carried to the shelves, and turned, generally, once a day, till it has acquired a sufficient degree of compactness, to enable it to undergo the operation of washing.

IV. Wiltshire Cheese. The milk which produces this cheese is *run*, as it comes from the cow, or as it happens to be *lowered*, by the small quantity of skim-milk mixed with it. The curd is first broken with the hand and dish, care being taken, in first crushing the curd, to let the whey run off gradually, to prevent its carrying away with it the "*fat*" of the cowl. For thin cheese, the curd is not broken so fine as in Gloucestershire; for thick cheese, it is crushed still finer; and, for what is called *loaves*, it is, in a manner, reduced to atoms. The whey is poured off as it rises, and the curd pressed down. The mass of curd is then *pared down*, three or four times over, in slices about an inch thick, in order to extract all the whey from it, pressed, and scalded in a similar manner to the Gloucester cheese. After separating the whey, the curd is, in some dairies, rebroken, and salted in the *cowl*; while, in others, it is taken warm out of the liquor, and salted in the vat: thin cheese being placed, with a small handful of salt, in one layer; thick ones, with two small handfuls, in two layers; *loaves*, with two handfuls, in three or four layers; the salt being spread, and rubbed uniformly among the curd. Wiltshire cheese is commonly salted twice in the press, where it remains, in proportion to its thickness; thin cheese three or four *meals*; thick ones, four or five; and *loaves*, five or six.

[Wiltshire cheese is esteemed among the best kinds that are made in England.]

V. Cottenham Cheese. The superiority of this cheese, both in delicacy and flavour, is not ascribed to any particular management of the dairies, but solely to the fragrant nature of the herbage on the commons.

VI. Suffolk, or Skim-Cheese. The curd used in making this cheese, is "broken up," in the whey, which is poured off, as soon as the former has subsided; the remainder, with the curd, being thrown into a coarse strainer, and exposed for cooling, is then pressed as tightly as possible; after which, it is put into a vat, and set in a press, for a few minutes, to discharge the remaining whey. When all the liquid part is drained off, the curd is taken out, again broken as finely as possible, salted, and returned to the press....In some large dairies, mills are employed for breaking the curd....This kind of cheese is much used at sea, as being less liable to be affected by the heat of warm climates, than the others.

[Dr. Anderson remarks, that these cheeses are remarkable for "a horny hardness and indigestible quality."]

VII. Chedder Cheese is held in high estimation; but its goodness is attributed chiefly to the land on which the cows feed, as the method of making it is similar to that pursued throughout Somersetshire, and the adjoining counties.

VIII. Lincolnshire Cheese. By adding the cream of one meal's milk, to that which comes immediately from the cow, excellent cream cheese is made in that county. It is gently pressed two or three times, and turned for a few days, previous to its being sent to market. This cheese is usually eaten while new, with salad, radishes, &c.

Bath Cheese....Take 6 quarts of luke-warm new milk, to which should be added two quarts of spring water, and one large table-spoonful of rennet: when the coagulation is completed, which generally takes place in half an hour, the curd must be broken to pieces; then suffered to settle; and, after straining the whey, it should be put into square vats. In the course of an hour, it will be requisite to turn the curd; which operation must be repeated after some hours, or at night; and continued twice every day, till the cheese be fit for the table.

Hafod Cheese....Let 30 gallons of new milk, and 3 gallons of sweet cream, be mixed with the juice expressed from one peck of picked marigold flowers. An *ale-glassful* (perhaps $\frac{1}{4}$ of a pint) of sack or canary wine is then to be mixed; and a sufficient quantity of rennet contained in a bag, together with cloves and mace, should be added, in order to coagulate the milk. When the curd is formed, it must be broken very small; and, after carefully expressing the whey it ought to be put into a cheese vat, covered with a wet cloth, and pressed by the hands. A pound of newly made butter is then to be incorporated with such a quantity of salt as may be required to season the cheese; and, after combining these ingredients with the curd, the whole must again be put into the vat, and treated in the manner above described. Now, the cheese must be submitted to the action of the press; the wet cloths be changed for dry ones, every four hours; and, after having been thus squeezed for 24 hours, it should be placed beneath a smaller weight, and pressed for one week; during which it ought to be turned every day: at the expiration of that period, it must be removed to a dry place, and shifted every other day, till it be ready for use.

Hafod Toasting Cheese, is prepared by warming new milk above the natural temperature; after which the rennet is added. As soon as the curd is *come*, it must be completely drained of the whey, and afterwards scalded with this liquor. The curd is now to be pressed in the cheese-mould, in order to render it as dry as its nature will admit; when it is broken into small pieces by the hand, and seasoned with a proper quantity of salt. Now it is again submitted to the press, and treated in the usual manner....This process, though more simple than that pursued in Gloucestershire, produces a toasting cheese, little inferior to that prepared in the latter county.

Having thus given an account of the principal sorts of cheese produced in this country, we shall likewise enumerate some of the most celebrated kinds prepared on the continent.

1. The Parmesan Cheese is made of the evening's milk, after having been skimmed in the morning, and at noon, and mixed with that of the morning, which has likewise been previously skimmed at noon. The whole is poured into a copper cauldron, resembling an inverted bell, and suspended on the arm of a lever, so as to be moved off and on the fire, at pleasure. In this, the milk is gradually heated to the temperature of about 120 degrees, when it is removed from the fire. As soon as it has subsided, the rennet, in a small bag, is steeped in it; and, being occasionally squeezed, a sufficient quantity of it soon passes into the milk, which is then well stirred, and left to coagulate. In the course of an hour, the coagulation is completed, when the milk is again put over the fire, and raised to a temperature of about 145 degrees: and, while it is heating, the whole mass is briskly agitated, till the curd separates in small lumps. Part of the whey is then taken out, and a little saffron added to the remainder, in order to colour it. When the curd is thus broken sufficiently small, nearly the whole of the whey is taken out, and two pailfuls of water poured in, by which the temperature is lowered, so as to enable the dairy-man to collect the former, by passing a cloth beneath it, and gathering it up at the corners. The curd is then pressed into a frame of wood, resembling a peck-measure without a bottom, placed on a solid table, and covered by a round piece of wood, with a great stone at the top. In the course of the night, it cools, assumes a firm consistence, and the whey drains off. The next day, one side is salted, and on the succeeding day the cheese is turned, and the other side rubbed in a similar manner. This operation is continued for about forty days, when the outer crust of the cheese is pared off, the fresh surface is varnished with linseed oil, the convex side coloured red, and the cheese is fit for use.

[The climate of Pennsylvania is similar to that of Placentia and Milan, where the cheeses called Parmesan are made: and it is highly probable, if we fail in making cheeses of equal flavour and excellence with the English, that we may rival those of Italy, which have a superior advantage in being found to keep in warm climates, much better than most other cheese.]

2. Green Swiss Cheese appears to possess no other peculiarity than that derived from the fragrant powder of the Common Meliot, or the *Trifolium Melilotus officin.* L. [a native plant of the United States,] which, however, imparts to it a strong flavour, rather offensive than agreeable to most persons: hence it is not calculated to become a favourite article in this country, though considerable quantities of Swiss cheese are annually imported for the tables of the luxurious.

3. Dutch Cheese is likewise prepared in the manner generally adopted in Cheshire, with this difference, that the Dutch, instead of rennet, make use of spirit of salt. Hence their cheese not only acquires a sharp saline taste, but is also said to be exempt from the depredations of mites: its rich buttery quality must be ascribed to the luxuriant vegetation in the low countries.

4. WESTPHALIA CHEESE. M. HOCHHEIMER, a German author, asserts "that it is preferred in England to the Dutch, Swiss, and even Parmesan cheese." Having had no experience of its taste, we can only give an account of the manner in which it is prepared.

After the cream is removed from the milk, when in a sub-acid state, the latter is placed near a fire, spontaneously to coagulate. The curd is then put into a coarse bag, and loaded with ponderous stones to express the whey: in this dry state, it is rubbed between the hands, and crumbled into an empty, clean milk-vat, where it is suffered to remain from three to eight days accordingly as the cheese is intended to be strong, or mild. This part of the process is called "skinning," or more properly, *mellowing*; because it undergoes the putrid stage of fermentation, and acquires a coat, or skin, on the top, before it is taken out of the vessel, and kneaded into balls, or cylinders, with the addition of a considerable portion of caraways, salt, and butter; or, occasionally, a small quantity of pounded pepper, and cloves. But, if it be too far advanced in the mellowing process, a third part of fresh curds, likewise crumbled into small pieces, is superadded, to prevent, or correct its putrid tendency. In short, the whole mass requires a powerful hand to form a complete union of parts; for it is very apt to corrupt, when imperfectly kneaded. As the pieces, when moulded, are of small size, not exceeding three or four ounces each, in weight, they soon dry in the open air, and are then fit for use. It is, however, necessary to turn and clean them, as well as to shift their places every day upon a board, in order to promote their maturity. After being nearly dry, they are sometimes (for the palate of epicures) suspended in a wood-fire chimney, by means of a net, for several weeks, or months: and both their taste and flavour, are said to be remarkably improved, whether kept in a dry air, or subjected to the action of smoke.

5. POTATOE-CHEESE. There are three varieties of this curious article prepared in Germany: we shall, however, describe only that sort which appears to us the most plausible.....The best mealy potatoes are selected, and half-boiled in steam; as, by bursting, their flavour and efficacy are diminished. When cool, they are peeled, and finely grated, or beat into a pulp with a wooden pestle. Three parts of this soft mass, and two parts of sweet curd, after expressing all its whey, are kneaded together, and allowed to stand two or three days in warm, and four or five days in cold, weather. The mixture is then formed into small pieces, like those of Westphalia cheese, and dried in a similar manner.

But, says M. HOCHHEIMER, if you wish to procure a *more delicious potatoe-cheese*, take only one part of potatoes, and three of the curd made of sheep's milk; let the kneaded mass remain three or four days in a vat, to become mellow; then put a stratum of it, one inch high, into a small firkin, strew a few lilac flowers, or caraways and mace, over it; spread a little fresh butter, about the size of a walnut, over these aromatics; then form another layer, repeat the same mode of seasoning the cheese, and proceed in a similar manner to the top of the vessel. When this cheese has been kept for some days

in a dry, airy place, without being exposed to the sun, it is said to excel in taste the best sort made in Holland; and to possess the additional advantage, that it improves with age, and generates no vermin. ....We have had no opportunity of ascertaining the truth of this boasted superiority, and candidly submit the process to the decision of our economical readers.

[Dr. ANDERSON thinks that the goodness of cheese depends more upon the particular process adopted in the management, than upon the materials of which the cheese consists. The taste of a Gloucester and that of a Cheshire cheese is very different from each other, though the quality of the milk of which they are made varies very little. The same thing may be said of Stilton and Parmesan cheeses, though their peculiarities are attributed to soil, or pasture, or other circumstances that seem to throw the blame of want of success from off our own shoulders.

The business of cheese-making has greatly improved within a few years past in the United States. The state of Connecticut, and the islands near New-Port, Rhode-Island, have deservedly obtained a great character for cheese-making; and an English family near Flemington, New Jersey, has also justly acquired the highest reputation in the business. Indeed they have clearly evinced, even to the most prejudiced, (upon some of whom an experiment has been made,) that age is only required to render their cheese equal in flavour and richness to those of England. And why should they not be equal, if the same care be used in every part of the process?

As no good cheese can be made without good rennet, it may be well to add the following account of the preparation of that substance, to the mode described by Dr. WILLICH.

" Dairy women usually preserve the maw, and the curd contained in it, after salting them; and then by steeping this bag and curd, make a rennet to turn their milk for making cheese. But a method which seems to be more simple, and is equally good in every respect, is, to throw away the curd, and after steeping it in pickle, stretch out the maw upon a slender bow inserted into it, which will soon be very dry, and keep well for a long time. Take an inch or two of the maw thus dried, and steep it over night in a few spoonfuls of warm water; which water serves full as well as if the curd had been preserved, for turning the milk. It is said that one inch will serve for the milk of five cows.

An ingenious writer, who has made strict inquiry into this subject recommends the following method of preparing a rennet, which he has found to be better than any other....“ Throw away the natural curd, which is apt to taint, and give the bag a bad smell; then make an artificial curd, or rather butter, of new cream, of sufficient quantity to fill the bag. Add three new laid eggs well beaten, one nutmeg grated fine, or any other good spice: Mix them well together, with three tea-cup fulls of fine salt: Fill the rennet bag with this substance: Tie up the mouth: Lay it under a strong brine for three days, turning it over daily. Then hang it up in a cool and dry place for six weeks, and it will be

fit for use. When it is used, take with a spoon out of the bag, a sufficient quantity of this artificial butryous curd for the cheese you purpose to make: Dissolve it in a small quantity of warm water, and then use it in the same manner, as other rennet is mixed with the milk for its coagulation."

Whatever kind of rennet the dairy woman chooses to prepare, she should keep it in mind, that this animal acid is extremely apt to turn rancid and putrify, and take care to apply a sufficient quantity of salt to preserve it in its best state. For it is probable that the rank and putrid taste, which is so often in cheeses made in this country, is owing to a putridity in the rennet." *Deane's N. E. Farmer.*]

Preservation of Cheese. Among the various productions of the vegetable kingdom, there are perhaps none better calculated for this purpose, than the following: 1. The leaves of the Yellow Star of Bethlehem. *Ornithogalum luteum*, L. 2. The Tutsan, or Park-leaves, *Hypericum Androsæmum*, L. and 3. The tender branches of the common birch tree, *Betula alba*, L.... The two first of which, in particular, have from experience been found to possess considerable antiseptic properties. They ought, however, to be employed only when moderately dry, in which state they should be placed upon, or at the sides of the cheese, in an airy situation. The twigs of the birch are especially useful, in preventing the ravages of mites.

Hard and spoiled cheese may be restored in the following manner: Take four ounces of pearl-ash, pour sweet white wine over it, till the mixture ceases to effervesce. Filtre the solution, dip into it clean linen cloths, cover the cheese with them, and put the whole into a cool place, or dry cellar. Repeat this process every day, at the same time turning the cheese; and, if necessary, continue it for several weeks: thus, the hardest and most insipid cheese has frequently recovered its former flavour.

Although we have devoted much room, and attention, to this important subject, considered in an economical view, we shall be very concise on the *physical properties* of cheese. This substance, being the coarsest and most viscid part of the milk, is digested with difficulty; and therefore calculated only for the more vigorous stomach of the healthy and laborious. Hence, persons of a delicate organization, as well as the studious and sedentary, ought carefully to abstain from its use; for, when eaten *new*, for instance *cream-cheese*, it is apt to disagree, produce rancid eructations, and impair the digestive organs: when *old*, it has a remarkable tendency to putrify, and taint the breath, even of the healthful. After dinner, a very small quantity of sound, old cheese, may do no injury; but it neither assists the digestion of food, nor produces any additional nutriment, when the vessels already abound with alimentary matter....Lastly, we advise those who know the value of health, and are enabled to procure more salutary food, never to make a meal upon bread and cheese alone.

CHEESE-RENNET, or YELLOW BED-STRAW, *Galium verum*, L. is a native plant growing on the sides of fields and roads. It has a firm, erect, square stem; short branches, terminating in spikes of small yellow blossoms, appearing in July and August.

The flowers of this plant coagulate boiling milk; and it is, we apprehend, erroneously supposed that the best Cheshire cheese is prepared by their influence. When boiled in alum-water, says Dr. WITHERING, they tinge wool yellow. The roots dye a very fine red, not inferior to madder. They also impart a similar colour to the bones of animals fed upon them. According to the experiments related by SUCCOW, the German chemist, a decoction of the whole plant, when in blossom, on adding vitriol of iron and spirit of salt, produced a fine green colour, which was likewise imparted to wool and silk.

Sheep and goats eat the yellow bed-straw; but it is refused by horses, swine, and cows. In France, the flowers are prescribed in hysteric cases. The juice of the plant has been successfully used in Britain; and, from an account given in the *Edinburgh Medical Commentaries*, it appears to be an efficacious remedy for the cure of scorbutic complaints.

CHEMISTRY is one of the most important branches of Physics, or Natural Philosophy; and, though not easily defined, we shall attempt the following short analysis: The science of chemistry implies the knowledge of the component parts of bodies, whether animal, vegetable, or mineral; that is, the art of decomposing *compound* substances; re-producing them, if possible; and ascertaining their physical properties, and relations to each other, as well as of determining, with accuracy, the affinity subsisting between *simple* earths, metals, &c......Others have defined chemistry to signify the study of such phenomena, or properties of bodies, as are discoverable, by variously mixing them, or by exposing them to different degrees of heat, in order to enlarge our knowledge of Nature, and improve the useful arts......There is no doubt that the changes taking place in bodies, are caused by *motion*, which, particularly by means of *heat*, is infused into, and perpetually agitates, the vast corporeal system..... The chemist, therefore, inquires into the *causes* of this motion, and by what means it may be generated, diverted, or checked. But, as these impulsive powers are not within the reach of reason unassisted by the observation of effects obvious to the senses, he endeavours to ascertain their nature, by carefully attending to the different action of bodies, when placed in contact with others, either in a dry or fluid state, or submitted to the operation of *fire*; from which he has discovered, more by accident than design, many hidden processes of Nature.

The extensive utility of chemical science, to a commercial and manufacturing nation, in almost every branch of trade, must be evident to the most superficial observer; for this knowledge essentially contributes to the improvement of all the productions of Nature and Art. Thus, the husbandman, the artisan in general, the brewer, distiller, soap-manufacturer, nay, even the baker, and the cook, may avoid many errors and disappointments, if they are but tolerably acquainted with the first principles of an art, which daily administers to our comforts and necessities.

The history of chemistry is involved in much obscurity: HERMES TRISMEGISTUS, a noble Egyptian, who lived 1900 years before the Christian æra, is said to be its in-

ventor; though MOSES, the legislator, probably possessed some knowledge of this captivating science. Previous to the time of ROGER BACON, an English friar of the 13th century, the whole was involved in mystery, and alchemical jargon. Like a bright star in a dark hemisphere, this genius demonstrated to his superstitious brethren, that, by studying Nature, and reducing her powers within the rules of Art, he could produce effects, which far surpassed the miracles of vaunting magicians, while they dispelled the whole tribe of charms, sorceries, and incantations. Nay, it is admitted, that he invented, but carefully concealed, the composition of gunpowder. But his deluded cotemporaries were not to be rescued from the grossest superstitious notions, till the way had been paved by the reformation of LUTHER; and another luminary arose, who was placed in circumstances more favourable to excite attention, and ensure respect to his doctrines..... This was the illustrious HOOK, who laid the foundation of chemical science in Britain. Others, indeed, on the Continent, such as PARACELSUS, VAN HELMONT, and Sir THEODORE MAYERNE, the last of whom afterwards spent thirty years in England, had successfully laboured for the improvement of chemistry; but the first of these was an impudent juggler; and the second, a credulous votary of the Paracelsian system. VAN HELMONT, however, must be allowed to be the original discoverer of *gaseous*, or aeriform bodies; for which discovery he was called a magician, and imprisoned by the dark tribunal of the inquisition.

Dr. HOOK proved, 1. That the air in which we live, move, and breathe, is the universal solvent of all inflammable bodies; 2. That it does not perform this action till the body be first sufficiently heated; 3. That this process of dissolution generates a very great *heat*, or what is called fire; 4. That light is also produced from this action; 5. That these phenomena do not arise from the air itself as an element, but from *that part* of the air which is inherent in it, and is like, if not the *very same*, as that which is fixed in *salt-petre*. Thus we find that the foundation was laid for the subsequent discoveries of BOYLE, MAYOW, and HALES, who first ascertained the exact quantity of air, or an elastic fluid analogous to air, either produced or absorbed by the burning of sulphur, or of candles, or by the respiration of animals..... Hence, the last mentioned philosopher compares the air to "a true Proteus, now fixed, now volatile, entering into the composition of bodies, where it exists in a solid form, deprived of elasticity, and of those properties which formerly distinguished it, adding gravity to these bodies, and under certain circumstances alone capable of recovering its elasticity, and becoming again an elastic thin fluid, and therefore well deserving to be adopted among chemical principles, and to possess a rank which has hitherto been denied it." In his admirable work, entitled *Vegetable Statics*, we perceive the first traces of the existence of air in those waters called *acidulous*; and he not only remarked that they contain four or five times more air than common water, but also conjectured, that they owed to it their sparkling and briskness.....

The truth and practical application of this discovery to medical purposes, were vigorously enforced by the immortal BOERHAAVE, whose reputation, both as a physician and a philosopher (two great qualifications, not always united), had resounded to the remotest parts of the globe.....Previous to his time, the illustrious BECHER first began to collect and compare the immense store of chemical facts, and arrange their relations towards a new system. Persecuted and despised, like most benefactors of mankind who forsake the beaten track, he fled from his native country, retired to England, and died of a broken heart at London in 1682. His theory, however, was adopted by the sagacious and intrepid STAHL, then first physician to the King of Prussia. In the opinion of these two authors, *fire* enters into the composition of all inflammable bodies, into metals, and most minerals; and in that condensed and fixed state, they called it *phlogiston*, or latent fire, to distinguish it from its condition, when in a free state. They farther believed that phlogiston is actually a material body, liable to be modified and influenced by circumstances; and that consequently *all* metals were compounds; and water, as containing no phlogiston, a simple body. Although this vague theory has been strenuously maintained by nearly all the chemists of Europe, for upwards of a century, and is still supported by Dr. PRIESTLEY, and many of his followers in this and other countries, yet, to the honour of our age, and we venture to say, the credit of that voluntary exile, the doctrine of the phlogiston is nearly exploded. To proceed in this explanation, according to the order of time in which the leading facts were ascertained, we shall first mention, that Dr. BLACK, our late illustrious professor of chemistry, in the University of Edinburgh, about the middle of last century, observed, that certain substances, such as marble, chalk, and limestone, when submitted to the process of fire, lost half their former weight; and, when treated with acids, the compound weighed less than before. Hence, it became evident, that *something* was lost; and, from a strict chemical analysis, he proved this something to be a permanently elastic fluid, which he termed *fixed air*.......deprived of which, the residue was caustic, or *quick-lime*, capable of corroding all animal and vegetable substances. Hitherto, the existence of fixed air, and its combination with bodies, was only conjectured, and no philosopher, since Van HELMONT's time, had adopted this opinion...... Thus, new views were opened in the examination of all matter, and the attention of experimental inquirers was principally directed to the decomposition of solid bodies. Dr. RUTHERFORD extended this inquiry, and determined the difference between fixed and *azotic* air, another species of suffocative gas, which cannot be respired by animals, nor is it miscible with water, and therefore by some called mephitic, or phlogisticated air...... This azotic air constitutes about seventy-two parts in the hundred of the common atmosphere, and therefore deserves particular attention: it was discovered by Dr. PRIESTLEY, and arises from the changes which atmospheric air undergoes in every process of combustion,

putrefaction, and respiration; in short, it is of the same nature as that contained in the air-bladder of the carp, and other fish. Being much lighter than the atmosphere, the azote instantly extinguishes burning tapers, and rapidly destroys the life of animals immersed in it.

The most splendid and important discovery of Dr. PRIESTLEY, however, is that of *vital air*, or oxygen, to which he was accidentally led, in August 1774, and which will transmit his name to posterity. This aerial fluid, which he denominates *dephlogisticated air*, because he supposed it to be deprived of all its phlogiston, also forms a considerable part of our atmosphere, so that it has been ascertained, by experiment, to exist there in the proportion of about 27 or 28 parts in 100. Thus, the composition of that boundless element in which we breathe and move, was, at length, discovered, and though BERGMANN and SCHEELE in Sweden, as well as LAVOISIER, in France, claimed an equal or coeval merit with Dr. PRIESTLEY, having, about the same period, in their experimental researches on this subject, observed similar phenomena; yet, we believe the last mentioned philosopher is justly entitled to the honour of being called the author of this great discovery. The manner in which it was made, is foreign to our purpose; and we shall therefore briefly state, that the ingenious and noble LAVOISIER, who fell a sacrifice to the ambition and tyranny of Robespierre, of infamous memory, established a new and more plausible system of chemistry upon the ground-work of this contested discovery, by which the component parts of the atmosphere were clearly and indubitably determined. In contradistinction to the exploded doctrine of phlogiston, the theory adopted by LAVOISIER, and supported by BERTHOLLET, MORVEAU, ADET, HASSENFRATZ, DE LA PLACE, MONGE, CHAPTAL, FOURCROY, and others, was now termed the *Antiphlogistic System*. The principal feature of the new French system is that the air is a *compound* body, and that metals, in general, are *simple* substances. We cannot, in this place, enter into farther particulars; and therefore only recommend to the juvenile reader, the perusal and study of such elementary works as afford a plain and accurate explanation of that admirable and highly useful science; without a competent knowledge of which, he will ever remain in a state of infancy, at least with respect to the numberless phenomena taking place in the physical world. We regret, however, that a publication calculated completely to answer the expectations of an ordinary reader, is still a *desideratum*; though there have been published within the last twenty years, a great variety of instructive books on this subject. The principal difficulty appears to arise from the unsettled state of chemical nomenclature, which has lately been, in a great measure, removed by the praiseworthy labours of Dr. PEARSON, Dr. DICKSON, and Mr. PARKINSON; yet, whatever merit these introductory works may possess, there is still wanted a concise, perspicuous, and systematic analysis of the science of chemistry, such as could be read, with satisfaction, by every person possessed of ordinary talents. GIRTANNER and SCHERER, in Germany, have attempted such

works; but their manuals abound in too abstract propositions, and are written in a dogmatical rather than narrative style, and may tend to entertain the reader, and imperceptibly lead from the more simple to connected propositions. Although it be perfectly consistent with scientific arrangement, to begin the explanation of a system with general truths, and then descend to particulars; yet we incline to think, that the young student, as well as readers in general, would acquire a more correct idea of a subject, by commencing the series of principles with such illustrations as would render every term, involved in the first definition, perfectly clear and familiar to their understanding. Thus, the immortal BACON was peculiarly happy in defining *simple* ideas, before he proceeded to reduce them under *general* heads, and draw the inference, or exhibit the result, by the most unequivocal process of induction. Instead, however, of following the footsteps of this mighty genius, most of our modern physical writers, either begin the analysis of the subject with general maxims; or they dissect and divide the whole into *distinct* parts, and fatigue the reader with endless repetition, without affording him a view of the *synthesis*, or conjuncture of members (if that expression be allowed), which alone could enable him to connect the several causes and effects, of which the whole is composed. In justice, however, to LAVOISIER, the founder of the new system, we shall observe, that his "*Elements of Chemistry*" possess, in this respect, uncommon merit; though he dwells too long upon the *rationale*, without exemplifying the principles, in such a manner as to impress the mind with sensible objects, which alone can permanently fix the idea, and connect every link of the proposition. We claim the indulgence of our readers for this involuntary digression; and though we cannot, in truth, exclusively recommend any late work, published in the form of a *popular*, or familiar introduction to chemistry, yet we shall mention several valuable treatises, that have successively appeared, and are entitled to attention. The different translations from the French of LAVOISIER, CHAPTAL, and FOURCROY, and especially that of the last, by Mr. JOHN THOMSON, deserves to be read, and diligently studied; that from the German of Professor GREN is likewise a work of merit, for professional readers; and among the original English works, we shall point out Dr. HIGGINS's "*View of the Phlogistic and Antiphlogistic Theories*" (8vo. 7s.); Mr. NICHOLSON's "*First Principles of Chemistry* (8vo. 8s. 6d.); and Dr. GARNETT's "*Outlines of Lectures on Chemistry* (8vo. 4s.); besides these, there are several smaller tracts, among which we remember with satisfaction, the perusal of that written by Mr. HENRY, of Manchester.

[It is much to be regretted that this noble and pleasing science, should have been so long pursued without being applied to the useful purposes of life. Of late, however, the application of the principles of the science to the mechanic arts, to agriculture, and the common purposes of life, has engaged the attention of some celebrated characters, and occasioned a great increase

of certainty in various domestic and mechanical arts, and considerable benefit to whole nations.

In a domestic point of view, a knowledge of chemistry would seem indispensible. The making of bread, the brewing of beer, making of wine, cyder, and vinegar, the distillation of ardent spirits; the preservation of animal and vegetable foods; the extraction of starch, flour, sugar; the making of butter, and cheese, the making of soap, are all truly chemical processes, which will be conducted with most advantage by those who are best acquainted with the principles connected with them; and it may be safely concluded that were the industrious economists more generally possessed of chemical knowledge, domestic processes would not be often unsuccessful.

To the farmer, a knowledge of the principles of chemistry is no less necessary. By chemistry he will become acquainted with the precise composition of soils and manures; and will thence know how to distinguish the different kinds of earth in his grounds, to judge of the proportions in which they are mixed, and to determine those soils which are most suited to certain crops: to ascertain the different qualities of the various manures, and thus know the proper methods of applying them; to ascertain the best method of improving a poor soil, and to effect by a mixture of earths, what is not to be done by manure alone. Indeed any knowledge that can be acquired on these subjects, without the aid of chemistry, must be vague and indistinct, and can neither enable its possessor to produce an intended effect with certainty, nor be communicated to others in language sufficiently intelligible. Thus the expressions, clay, loam, marl, chalk, convey different ideas to different persons, by which all general benefits of experience in agriculture must be greatly limited.

Chemistry may to farmers, become an universal language, in which the facts that are observed in this art, may be so clothed, as to be intelligible to all nations and ages. It would be desirable, for example, when a writer speaks of clay, loam, or marl, that he should explain his conception of these terms, by stating the chemical composition of each substance expressed by them. For all the variety of soils and manures, and all the diversified productions of the vegetable kingdom are capable of being resolved, by chemical analysis, into a small number of elementary ingredients. The formation of a well defined language, expressing the proportion of these elements, in the various soils and manures now so vaguely characterised, would give an accuracy and precision, hitherto unknown, to the experience of tillers of the earth.

CHENOPODIUM, *Goosefoot.* Of this genus we have several species, as the album, viride, botrys, (cut leaved), aristatum, (awned), anthelminticum, (wormseed, Jerusalem oak.) The last mentioned species is much used as a remedy for worms. The whole plant has a powerful smell, of which it is very retentive. The taste is bitter, with a great deal of acrimony. The whole plant may be employed. Sometimes the expressed juice is used, in the dose of a table spoonful for a child, two or three years old. The seeds are more commonly used. They are reduced to a fine powder, and made into an electu-

ary with some syrup. Of this the dose for a child, two or three years old, is a table spoonful taken early in the morning. The patient is to be kept without nourishment for some hours after. At night a like dose is to be given. It is often necessary to continue this course for several days. See GOOSEFOOT.]

CHERRY, a species of the *Prunus*, L. or plumb-tree, a genus of plants, comprising many species, originally natives of Persia; whence they were introduced into Italy, as well as other parts of Europe; and are supposed to have been brought from Flanders into England, in the reign of HENRY the Eighth....The principal species, growing in our climate are the following:

1. The *Padus*, or bird-cherry, or wild cluster cherry, a shrub which flourishes wild, on almost any soil, if not *wet* (WITHERING); and is found chiefly in the hedges and woods. It bears lopping, and does not stifle the growth of grass. Sheep, goats, and swine eat the leaves, but they are not relished by cows, and refused by horses. Its fruit is nauseous; but, when bruised, and infused in wine, or brandy, it imparts an agreeable flavour. Its smooth and tough wood is made into handles for knives and whips. The inner bark is said to afford a fine green colour, on boiling it with alum.

BECHSTEIN observes, that this dwarf tree, when transplanted into a rich soil, attains the height of forty feet, and two feet in diameter; and that it thrives most luxuriantly near hedges and waters. As its abundant white blossoms, in May, present a picturesque view, it deserves to be cultivated on the borders of parks and gardens....HOLMBERGER, a Swedish author, remarks, that the dried kernels of this cherry are equal in taste and flavour to almonds, and yield, on expression, a fine and plentiful oil. A decoction of the berries is sometimes successfully given in the dysentery.

2. The *Cerasus*, or common wild cherry tree, which is frequently found in woods and hedges, but is probably produced from the stones of the garden-varieties, dropped by birds. It delights in a *sandy* soil, and an elevated situation, and often grows from fifteen to thirty feet in height, but is seldom more than nine inches in diameter. It flowers in the month of May; its sour fruit is eaten by country people, either fresh or dried, and is frequently infused in brandy, on account of its aromatic flavour.

Cherry-trees require to be planted from twenty to thirty feet distant, and to be set deeper in the earth than apple-trees; with the management of which, in other respects, they correspond. Their growth is said to be uncommonly promoted, by laying a composition of lime and night-soil on their young stems, with a brush, which operation has a similar effect on apple-trees.

The best method of raising cherry-trees is, to plant them among hops, in alternate rows with apples, and with two rows of filberts between each; by which means they arrive very speedily at perfection, and thus amply repay the expence and labour bestowed on them at first. The proportion (in the county of Kent, where this species is principally cultivated) is usually, to an acre, 800 hop-hills, 200 filberts, and 40 cherry and apple trees. The hops will stand about twelve years, and the filberts about

thirty, by which time the cherry and apple trees will occupy the whole land.

This species of the *Prunus* is, according to LINNAEUS, the parent-stock, from which many of the cultivated varieties are derived: there are many different sorts, which are known under the names of Blackheart, Whiteheart, *Flemish*, or early Kentish, Courone, and Hertfordshire black, Cherries. All these have been raised originally from stones, and afterwards preserved by budding, and grafting on stocks of the wild black and red cherry, reared for this purpose. In order to ensure a luxuriant vegetation, and a delicious flavour, to these varieties, the stones of the black cherries should be set, or sown, in autumn, to raise stocks; and planted out, the second year after they come up, in lines at the distance of about two feet.

[Cherries are said to have come originally from the borders of the Caspian Sea. The following twenty are the principal cherries cultivated in the U. S. the account of which was furnished by Mr. William Prince of Long Island.

May Duke, ripe in May and June: long stem, round and red, an excellent cherry, and bears well.

Black Heart, ripe in June: a fine cherry.

White Heart (or Sugar Cherry) ripe in June: white and red.

Bleeding Heart, ripe in June, a very large cherry of a long form and dark colour; it has a pleasant taste.

Ox Heart, ripe in June: a large, firm, fine cherry.

Spanish Heart, ripe in June.

Carnation, ripe in July, it takes its name from its colour, being red and white, a large round cherry, but not very sweet.

Amber, ripe in July.

Red Heart, do.

Late Duke, do.

Cluster, planted more for ornament, or curiosity than any other purpose.

Double Blossom, ripe in July.

Honey Cherry, do. small sweet cherry.

Kentish cherry, ripe in July.

Mazarine, do.

Morello, do. and August; a red acid, cherry, the best for preserving, and for making cherry-brandy.

Early Richmond Cherry. This fruit originated near Richmond in Virginia, and is the earliest cherry in America, and valuable on that account; it is the size of a May Duke, and resembles it in form.

Red Bigereau, a very fine cherry, ripe in July, of a heart shape.

White Bigereau, ripe in July and August: remarkably firm, heart shape.

Large Double Flowering Cherry. This tree produces no fruit, but makes a handsome appearance in the spring, when it is covered with clusters of double flowers as large as the cinnamon rose; it differs from the common double flowering cherry which never forms a large tree, and has small pointed leaves.

The three last were imported from Bourdeaux in 1798.

Small Morello Cherry, called also Salem Cherry, because it came originally from Salem county, New Jersey, is cultivated by Mr. Cooper of that state, who values it highly. The fruit has a lively acid taste. The tree produces abundantly, and is the least subject to worms of any cherry trees.

Mr. C. says that the Bleeding Heart suits a sandy soil, but that

the May Duke will not flourish in it.

Those who are disposed to have a greater variety of cherries will find an account of all that are cultivated in England, given by FORSYTH in his Treatise on Fruit Trees. The following directions for planting, pruning, and training cherry-trees, are given by the same author. "In the choosing and planting of young cherry trees, the same rules are to be observed that are given for apricots, peaches and nectarines; and they must, in like manner be headed down the first year.

In pruning cherries never shorten their shoots; for most of them produce their fruit at the extremities, the shortening, or cutting off of which very frequently occasions the death of the shoot, at least of a great part of it. The branches, therefore, should be trained at full length. I have often seen the whole tree killed by injudicious pruning. Wherever the knife is applied it is sure to bring on the gum, and afterwards the canker, which will inevitably kill the trees if no remedy be applied to the wounds. I have headed down a great many cherry trees which were almost past bearing, and so eaten up by the gum and canker, that the few cherries they bore, were very bad.

In the years 1790 and 1791, I headed down fifty trees. The operation should be performed in the month of April in each year. These trees made shoots from three to five feet the same summer, bore fine cherries the next year, and have continued to bear good crops ever since.

To the above trees I applied the composition. At the same time I cut down twelve trees in the same row, but did not apply the composition: these twelve trees all died in the second and third years after. One tree where the composition was applied now produces more fruit than the whole number formerly, also much finer and larger.

When cherry-trees are very old and much injured by large limbs having been cut or blown off (which will bring on the canker and gum) the best way to bring them to have fine heads, and to fill the vacant space, is to head them down as low as possible, taking care to leave some small shoots, if there be any; if not, a bud or two at the end of some of the shoots. Sometimes it is difficult to find any buds. In that case, before you mean to head the trees, make some incisions in the branches. This should be done on different branches, at the most convenient places for filling the tree with good wood. The size of the incisions should be from one to two inches according to the size of the branches, observing to make them just above the joint where the buds should come out.

The time for performing this operation is March, April, or May, (in America, March). The above method is only recommended where there are no young shoots or buds, and when the tree is in the last stage of the canker.

Where you find a few young shoots or buds, cut down the head as near to them as you can, and take care to cut out all the canker till you come to the sound bark. If any gum remains it must be cut or scraped off: the best time for this is when it is moistened with rain; it may then be scraped off without bruising the bark. This operation is very necessary.

Wherever the bark or branches have been cut off, the edges should be rounded, and the composition applied. If the young shoots are properly trained, they will produce fruit the following year; and in the second year they will produce more and finer fruit than a young tree which has been planted ten years.

Never make use of the knife in summer, if it be possible to avoid it, as the shoots die from the place where they are cut, leaving ugly dead stubs, which will infallibly bring on the canker. These shoots may be cut in the spring to about 2 eyes, which will form a number of flower-buds.

When cherry trees begin to produce spurs, cut out every other shoot to make the tree throw out fresh wood: When that comes into a bearing state, which will be in the following year, cut out the old branches that remain; by that method you will be able to keep the trees in a constant state of bearing, taking the same method as before directed with the fore right shoots.

Great care should be taken to rub off many of them in the month of May (middle of June in America), leaving only such a number as you think will fill the tree. By so doing your trees will continue in a fine healthy state, and not be in the least weakened by bearing a plentiful crop of fruit. The reason is obvious, the great exhalation which would be occasioned by the sun and air in the common mode of pruning is prevented by the composition keeping in the sap which nourishes the branches and fruit. I cut some trees, as directed above, more than twelve years ago, that are now in as good a state of bearing, as they were in the third year after the operation, and likely to continue so for many years.

In 1797 I cut some very old trees in the month of May, which were left, to shew the old method of pruning; I at the same time cut some branches off the same trees, according to the new method, to shew the difference of the fruit, which was taken by all who saw it for a different sort of cherry. The cherries from the old spurs were not half the size of the others, and were at least three weeks later.

Several persons have adopted the new method with great success, and by renovating their old trees which scarcely bore any fruit, have obtained from them an abundant quantity. But even the increased *quantity* of the fruit is not so material, in cherries, as the increase in the *size* and in the *richness of the flavour*. In this respect the method of pruning here laid down, is invaluable. When old standard cherry trees become decayed and hollow, I would recommend heading them down, as directed for wall-trees and dwarfs. Scoop out all the rotten, loose, and decayed parts of the trunk, till you come to the solid wood, leaving the surface smooth; then use the composition as directed for Fruit Trees."

The common wild or native cherry (*Prunus Cerasus Virginia*) though it bears only a small bitter cherry, which serves as food for birds, is valuable on account of its medicinal bark, and also for its timber, which is of a reddish streaked colour, resembling mahogany, and capable of receiving a fine polish; it is used by Turners and Cabinet makers, for many puposes. The tree grows to a large size.

Birds are very fond of the fruit of the wild cherry tree, and they will frequently become intoxicated from eating them. [The leaves are poisonous to calves.]

The bark of the Wild Cherry tree is powerfully tonic, and has been frequently substituted for the Peruvian bark with great success. It is slightly narcotic, and commonly produces drowsiness in those who take it. From the experiments of Mr. C. Morris of Virginia (Inaug. Diss. 1802. Phil.) it appeared that the bark of the root was more powerful than the bark of the trunk. Very excellent effects have been produced by washing ill conditioned ulcers with a decoction of the bark. While this valuable tree abounds in the United States, we act very unwisely in sending thousands of dollars out of the country for the Peruvian bark. It ought to be propagated by every land holder: and when a tree is felled for timber, the bark should be carefully preserved.]

Cherry-trees prosper best when grafted; and, exclusively of their delicious fruit, afford, by their plentiful leaves, an excellent article of food for fattening hogs....They also exude a gum in every respect equal to gum arabic; and which is so extremely nutritive, that, according to Hasselquist, above 100 men were kept alive, during a siege, for nearly two months, with no other sustenance than that produced by gradually dissolving a little of this gum in the mouth....The wood is hard and tough; it is used by turners in the manufacture of chairs, and stained to imitate mahogany.

From the ripe black cherries of the second species, the Swiss distil a very agreeable *liquor*, or ardent spirit, by the sale of which, to the French and Germans, they annually derive considerable profit. For *preserving* this fruit during the winter, we communicate the following recipe, inserted in Hochheimer's German work on *Domestic Economy*....Take, in the proportion of two pounds of sour cherries, half a pound of fine loaf sugar, and a pint of white wine vinegar; boil the two last, and skim off the impurities from the top; then let the liquor stand, till it become lukewarm. Meanwhile, prepare a coarse powder, consisting of two drams of cinnamon, and one of cloves; break the stalks of the cherries in the middle, so as to leave half of their length for the jar, into which they must be carefully put in layers, strewing a little of the spice between each stratum, pouring the liquor above-mentioned on the top, and securing the whole from the access of air.

With respect to their physical effects, cherries may be divided into sweet, sub-acid, and pulpy. The first kind, though the most palatable, are the least wholesome, as they readily ferment, and produce flatulency in weak stomachs; the second are the most antiseptic; and the third, the most nourishing, but digested with some difficulty. Hence we would preferably recommend the sub-acid cherries, as an excellent article of domestic medicine in the true scurvy, in putrid fevers, and the dysentery; as likewise to those persons, who are liable to obstructions in the alimentary canal. With this intention they may be eaten in considerable quantities, and frequently from half a pound to a pound each time, but particularly on an empty stomach. Nor will they be found less saluta-

ry to constitutions whose bile is vitiated, whose stomach is troubled with foul eructations, and who are afflicted with an offensive breath: all such persons should eat them freely. For similar reasons, *dried cherries* form an excellent article of diet, in acute or inflammatory disorders: where they should be used both in substance, and in decoctions, which are equally cooling and antiseptic.

[CHERRY BRANDY is best made in the following manner.

Fill the cask with an equal proportion of morello and sweet black cherries; pour over them as much brandy as the cask will contain. When it has been on ten days, draw it off, and pour on hot water, let this remain some time, shaking the cask frequently, then draw it off and mix the last with the first liquor.

CHERRY BIRD, *Cedar Bird*, *Crown Bird*. (Ampelis Garrulus) a beautiful creature, the plumage of a silky, or velvet-like texture, and an active bird; his head is adorned with a high peaked crest. The peculiar characteristic of the species, is having the second order of quill feathers in his wings tipped with a bright red boney substance, representing little drops of red sealing wax: this is confined to the male. These birds are residents, shewing themselves in flocks every month in the year, except June, July and August, when they are employed in building their nests and rearing their young. They feed on all sorts of succulent fruit, particularly such as have a sweet pulp, as cherries, &c. WM. BARTRAM.]

CHERVIL, or *Chærophyllum*, L. a genus of plants comprising ten species.

1. The *sylvestre*, or wild chervil, or smooth cow-parsley, or cow-weed chervil, which thrives in hedges, orchards, and pastures. It has a woolly striated stem, erect umbels, and white flowers, which blow in the month of May.

The umbels of this plant afford an indifferent yellow dye; the leaves and stems a beautiful green. Its presence indicates a fruitful soil, but it ought to be eradicated from all pastures early in the spring, as cows, rabbits, and asses, are the only animals that will eat it...... LINNAEUS informs us, that the roots, when eaten as parsnips, have been found poisonous; yet, according to Mr. CURTIS, they were in some parts of Britain, during times of scarcity, eaten as a pot-herb.

2. The *temulentum*, rough cow-parsley, or rough chervil, growing in hedges, and bearing flowers in the months of July and August..... It possesses no peculiar properties.

[3. The *c. arborescens* is a native of the United States: its stem is shrubby; leaves large, superdecompound, with the palms much expanded, glossy, gash serrate...... Umbels thin, white, with a partial involucre; all the florets fertile.]

CHERVIL, the GREAT, or Shepherd's Needle, the *Scandix odorata v. Cerefolium*. See Sweet CICELY.

CHERVIL, the NEEDLE, or Venus Comb, the *Scandix Pecten*..... See Common Shepherd's NEEDLE.

CHESNUT, or *Castanea*, L. is a species of the *Fagus* or beech-tree, a genus of plants comprising five species. It flourishes on poor gravelled or sandy soils, and will thrive in any but moist or marshy situations. Those trees, however, which are intended for fruit, should be raised in nurseries from nuts,

removed at least three times, and have the tap-roots cut off, in order to facilitate their growth.

There is no plant cultivated, that is more valuable than the chesnut; as it grows to a considerable height, and its wood, if kept dry, is extremely durable. This ornament to the country is, at the same time, of great utility for domestic purposes. It excels the oak in two respects, namely, that it grows faster, and that the "sap-parts" of the timber are more firm, and less liable to corruption. The shoots from the stubs being numerous and luxuriant, it makes an excellent underwood, and is of great service for hop-poles, as it may be cut when about eighteen or twenty years old, and will continue productive for nearly thirty years. Being greatly superior to elm for door jambs, and several other purposes of house carpentry, it is considered as nearly equal to the oak itself; but, on account of its possessing a precarious brittleness, which renders it unsafe for beams, it ought not to be employed in any situation, where an uncertain weight is sometimes to be supported.

It has been much questioned, in England, whether the chesnut is indigenous or exotic. There is no doubt, that it was industriously cultivated by our ancestors; and this circumstance, together with the existence of the celebrated chesnut at Tortworth, in Gloucestershire, has been urged, with great probability, as a proof of its being a native. That stupendous tree is 52 feet in circumference, and has according to authentic records, stood there ever since the year 1150, when it was so remarkable as to be called "*the Great Chesnut of Tortworth.*" It fixes the boundary of the manor, and is probably not less than 1000 years old. On the contrary, it has been asserted, that from its being called the *Spaning Chesnut*, it is a native of Spain, and was introduced from that country, at some distant period. However the question may be decided, it will be generally admitted that, in this climate, there is no plant which so fully merits the great attention which has of late years been paid to its growth. We, therefore, cordially join in recommending it to those who intend to form plantations, whether for ornament or use, as a tree which for dura·ility, beauty, and stature, will amply, and in a very short time, repay all the labour and expence that may be bestowed upon its culture.

All writers agree that the wood of the chesnut is peculiarly excellent for casks, as it neither shrinks, nor changes the taste, or colour, of the liquor. It is also converted into various articles of furniture, and when stained, may be made to resemble in beauty and colour the finest mahogany: this improvement is effected, by rubbing it over, first with alum water, then laying on with a brush a decoction of logwood-chips; and lastly, a decoction of Brazil-wool. Besides these various uses, to which this tree may be applied, its fruit affords an agreeable addition to our winter dessert. If properly managed, a sweet and nutritious bread may be prepared of it, especially when mixed with a small proportion of wheaten or other flour. In its wild state, it is called the *horse-chesnut*, and, independently of its beauty as an ornamental tree, its mealy nuts supply not only an excellent food for fattening deer and hogs, but are likewise of great service in whitening

cloth, and the manufacture of starch. For this latter purpose, a patent was granted to Lord William Murray, March 8, 1796, of whose process we subjoin the following account. The nuts must be first taken out of the outward green prickly husks, and the brown rind carefully pared off, so as totally to eradicate the sprout, or growth..... They are next to be rasped, or grated fine into water, and the pulp thus produced should be washed, as clean as possible, through a hair sieve. This washing is repeated twice through fine sieves, constantly adding pure water, to prevent any starch from adhering to the pulp. The last process is, to strain it with a large quantity of water (about four gallons to a pound of starch) through a fine gauze, muslin, or lawn sieve; in order to clear it entirely of all bran, or other impurities. As soon as it subsides, the water is to be poured off, and the remaining substance mixed up repeatedly with clean water, till the latter becomes perfectly colourless. It should then be drained off till it is nearly dry, and set to bake, either in the usual mode in which starch is baked, or spread out before a brisk fire; care being taken to prevent it from "*horning*," or turning into a paste or jelly; which, as soon as it becomes dry, acquires the solidity and hardness of horn.

M. Lalevrie, a few years since, directed his countrymen, in one of the Paris Journals, first to peel the chesnuts, and to dry them either in the open air, or in a room...... When perfectly dry, they should be grated and pounded. The sifted flour is to be passed into a vessel containing water, and there strongly agitated. After standing at rest for an hour, the water is carefully poured off, to prevent the loss of any sediment. This infusion should be repeated eight or nine different times, with a proportionate quantity of water, till the liquor becomes colourless and insipid. The subsided pulp is then fit to be passed into a close linen bag; and, after pressing it, to be slowly dried..... The fine floury mass, or starch, thus obtained, will be found free from all bitterness, and astringency; it has no longer any disagreeable taste, and affords wholesome nutriment.

Chesnuts, especially the small esculent sort, form an important article of commerce, in Italy, and in the island of Corsica; which latter alone exports annually such quantities as amount in value to 100,000 crowns. The Germans roast them among embers, and eat them with butter and salt; the French, with lemon-juice and sugar, which agrees better with weak stomachs. This leguminous fruit is also employed in several articles of confectionary; as a substitute for coffee, and in the preparation of chocolate.

Although these nuts are palatable, and less oily than most productions of a similar nature, yet, when used in abundance, they are not easy of digestion, and ought therefore to be eaten only by the healthy and robust. To promote their solution and assimilation in the stomach, they require the aid of salt, in a considerable proportion; but the addition of butter renders them still heavier, and tends to retard rather than to accelerate their conversion into alimentary matter.

[The characters of the chesnut tree are nearly the same as the beech, except that the male flowers are disposed in cylindrical katkins.

The styles more numerous and bristly. The capsules much larger, round, and set very thick with long prickly spines; containing from one to four or five, but generally two or three nuts, filled with sweet kernel.

This tree is highly valuable for many purposes, and ought to be carefully attended to by the people of this country. The superiority of the timber over most others in durability, is well known; and the nuts are also very profitable. The tree splits easily, and hence is used for fence rails. An old chesnut tree is very brittle, and apt to crack, and therefore should never stand longer than while it is in a growing state. If cut when it squares only six inches, it will be most durable, having very little sap in proportion to other trees. The nuts are the usual, and in some places, almost the only food of the common people in Italy, Savoy, and France, not only boiled and roasted, but also in puddings, cakes, and bread.

The tree may be propagated by planting the *nuts* with the *burrs*, in the spring. The best nuts for planting, are such as are brought from Portugal and Spain, or a large fine kind which are sometimes seen in the Philadelphia markets. The direction to plant the nuts in the burrs is given, in consequence of the destruction of them, which a gentleman in New-Jersey (who has wisely planted several acres) lately experienced from field mice. The nuts, if imported, must be brought over in boxes of earth. In setting the nuts, make a drill with a hoe, about 4 inches deep, and six inches distant, with the eye uppermost: then draw the earth over them with a rake, and make a second drill at about a foot distance from the former, proceeding as before, allowing three rows in a bed, with an alley between them three feet broad, for conveniently cleaning the beds...... Keep the ground clear of weeds, and in two years remove the trees to a nursery, at a wider distance. In three years afterwards, transplant them into the places where they are intended to stand.

In Portugal and other countries, they graft cyons from trees bearing the largest and fairest fruit, upon stocks raised from the nut. Those grafted trees are unfit for timber.

Another way of propagating the tree is, to encircle the stump of a tree, recently felled, by rails...... Shoots will come out the first year, and form a bush in two seasons.

Chesnut trees, but particularly those bearing large fruit, ought to be preserved with religious care. No more certainly productive legacy could be left by a parent to an infant than land planted with an hundred thousand chesnuts.

Forsyth gives a number of judicious directions respecting the propagation of chesnut trees, which cannot be well abridged, but ought to be consulted by every one who may wish to propagate this valuable tree.

Mr. Wm. Prince, of L. Island, informs the editor, that the Spanish or Portugal chesnut succeeds well in the United States, aud produces fruit in about seven years from the seed: it grows more rapidly than the American chesnut; the fruit is more than four times as large, and for boiling or roasting is generally preferred.

It may be budded on the common chesnut, but, being of quicker growth, is apt to overgrow the stock. It is best to raise it from seed, which, if the trees from which

the seeds are taken do not grow too near the common chesnut, will produce the genuine sort.

2. Fagus, *Castanea pumila*, Dwarf chesnut tree, or Chinquepin. This seldom rises above eight or twelve feet, otherwise much resembling the chesnut in the appearance of its branches and leaves. Its fruit capsules are small, and generally contain but one conical shaped nut. It grows naturally in a light gravelly soil: when exported, the nuts should be put up in sand, when ripe, and sent away immediately, otherwise they loose their vegetating quality.]

Horse-Chesnut, or *Æsculus*, L. a genus of exotic plants, natives of the East, consisting of four species: the principal of these is the *Hippocastanum*, or Common Horse-Chesnut. It thrives best in rich fat land, but will also flourish on clayey and marley soils.

The horse-chesnut was brought from Asia to Europe, in the year 1550: it is propagated from the nuts, which are gathered in autumn, and set in drills, about three inches asunder. In the spring, young plants will appear, which, at the end of twelve months, are to be taken up, the top roots shortened, and afterwards planted in a nursery. As sóon as they are of a proper size to be finally transplanted, they should be carefully removed, and set in large holes level with the surface of the ground, all the fibres being spread, and covered with fine mould. A stake should then be placed, to protect them from high winds, and the depredations of cattle, till they are of a sufficient size to defend themselves.

This tree grows so rapidly that, in the course of a few years, it becomes large enough, in groves and alleys, to afford a good shade during the heat of summer, when it is in full bloom. Its fruit furnishes a grateful food to horses, and has been successfully employed for fattening cattle, the tallow of which it renders uncommonly firm, especially when mixed with ground barley. The milk obtained from cows fed with it, is also said to be richer than that produced by any other aliment. The nuts have likewise been used with advantage in feeding poultry; but they are unwholesome for hogs. Deer are peculiarly fond of this fruit; which has also been usefully substituted for soap; because on steeping and boiling it in water, it makes a good lather, preparatory to the use of that more expensive article. There are, besides, various other purposes to which horse-chesnuts may be rendered subservient in the arts and manufactures.

Dr. Bohmer informs us, that M. Sprogel, an ingenious artisan of Gera, in Saxony, has discovered a method of preparing a paste, or size, from wild chesnuts, which may be used preferably to that made of wheaten-flour, by shoe-makers, book-binders, card-manufacturers, and especially by paper-hangers, who consume, or rather *waste*, considerable quantities of grain, in their respective branches of trade. With this design, the nuts are first cleared of the hard shell, as well as the inner skin; then cut into three or four parts; dried hard in an oven; and afterwards reduced to fine flour, either in a mill or mortar: rain-water is next poured on them, and the whole is properly stirred till it acquire a due consistence. This paste possesses a great advantage over the common *size*; as no moths, or vermin, will breed

in the articles cemented with the former; but as it is apt to become mouldy, or sour, in 48 hours, it will be necessary to dissolve a small portion of alum in the water before it is mixed, or to employ equal quantities of chesnut and wheaten-flour: such precaution, however, is unnecessary, when it is intended for immediate use.

Prof. BECKMANN states, that horse-chesnuts yield, by distillation, a spirituous liquor, which, notwithstanding its bitter taste, may frequently serve as a substitute for alkohol; and, though 20 pounds of this fruit produce only three ounces of a pure spirit, yet it is equal to that obtained from wine lees, and the remainder still affords food for cattle.

Prof. LEONHARDI observes, in his *Economical Pocket-Book* for 1793 (in German), that the prickly husks of the horse-chesnut may be advantageously employed in tanning leather; and, when burnt to coal, they are said to produce an excellent black water-colour........ SUCKOW has made experiments with the brown glossy shell of this fruit; from which it appears, that, when bruised and boiled in water, with the addition of a little pot-ash, it makes a saturated bark-brown dye, which imparted to cloth previously dipped in a solution of green vitriol, a yellow brown, and to that prepared in alum-water, a faint red-brown colour. According to DAMBOURNEY, both the branches and leaves communicate a good brown in dyeing.

RUGER (in his *German Pocket-book for Painters*) gives the following recipe for preparing an excellent brown water-colour: Take the smooth, ripe shells of the horse-chesnut, reduce them to a coarse powder, and boil them for several hours in water; next filter the liquor through flannel, and let it stand till the colouring particles subside; then carefully decant the clear fluid, and dry the sediment. Even in this simple manner, the decoction afforded a beautiful brown colour; which, however, was considerably improved, on adding a small portion of gum-arabic.

The wood of the horse-chesnut is, in every respect, equal to that of the common chesnut; and, as the former thrives luxuriantly in coppices, it deserves to be more generally cultivated, with a view of raising timber for building. Indeed, it is highly probable that the fruit of this valuable tree might be so much improved by engrafting and innoculating, that the nuts may, in process of time, be divested of their peculiar bitterness and astringency.

In medicine, the bark has been found of eminent service in intermittent fevers, and is often substituted in Russia for the Peruvian bark.

[Of this genus, *Æsculus*, we have 1. *Æ. pavia*, scarlet flowering horse-chesnut, fish-poison, or buck-eye. This species abounds in different parts of the United States, especially to the southward. The roots of it, washed and bruised, are used in preference to soap, for washing woollens and coloured cottons; as they do not injure the colours so much as soap. Satins also, it is said, washed with this root, and carefully ironed, look almost as well as new. The fresh kernels macerated in water, mixed with wheat flour, and formed into a stiff paste, will, if crumbled and thrown into any water where there are small fish, make those which eat

of it so drunk, that they may be easily caught; but they soon recover when put into fresh water.

The fruit of our *æsculus pavia* is much larger than that of the foreign *æsc. hippocastanum.* and is of a whiter colour: that of the *hippocastanum* is yellow.

A single nut dried, weighed half an oz. and twenty grains, and yielded forty four grains of fine starch. Dr. Woodhouse prepared half a pound of this starch from the nuts of the *æsculus pavia*, and kept it two years, without impairing the white colour. It is superior to the finest Poland starch, and has been used, to starch various articles of dress, without imparting any yellow colour to them. The method of preparing it, is to take off the shells from the nuts with a knife; grate them in a vessel of water, which will hold the fine particles of starch suspended, when they are to be decanted into another vessel, which must remain at rest until the starch subsides to the bottom. The water is then to be poured off, and fresh water added, and the starch well stirred about in it, when it must be again permitted to subside. The water is then to be thrown away, and the starch dried in the sun. The water of the first washing holds a poisonous matter in solution, which, when evaporated to the consistence of an extract, and mixed with dough, as above mentioned, will intoxicate and swell the bellies of small fish. *Medical Repository*, vol. 3. p. 211.

2. *Æ. flava*, yellow flowered horse-chesnut, or tall buck-eye....*æ. octandra* of Marshall. This often grows to a pretty large size. It is a native of the western parts of Pennsylvania and Virginia.

3. *Æ. alba* also grows in the north west parts of Georgia, and W. Florida.

4. *Æ. Spicata*, with white spiked flowers: it is a dwarf, and was first found by W. Bartram, in Creek County, and afterwards brought by Mr. Michaux to Mr. B. from Flint River, Georgia.

5. Dwarf variegated flowered horse chesnut, found in the Cherokee country by Mr. W. Bartram.

The bark of the *æsculus hippocastanum* has been recommended by many writers as a substitute for the Peruvian bark: our medical gentlemen in the country should try the bark of our native species.]

CHEST, in commerce, a kind of measure, which contains an uncertain quantity of various commodities. Thus, a chest of sugar holds from 10 to 15 cwt.; a chest of glass from 2 to 300 cubic feet; of Castile soap, from $2\frac{1}{2}$ to 3 cwt.; of indigo, from $1\frac{1}{2}$ to 2 cwt.; computed at 5 score to the hundred.

CHEWING, or mastication, is the action of the teeth, by which solid food is broken, and divided into smaller particles: thus, being at the same time mixed with the saliva, it is better prepared for digestion, both on account of its pulpy state, and the solvent nature of the fluids, secreted by the salival glands, during the exertion of the adjacent muscles. Hence it is obvious, that those persons, who are in the habit of swallowing their meals with expedition, and afterwards inundate the stomach with large potations, do themselves a double injury: 1. Because their food passes through the stomach only half digested.....affording but a scanty supply of real nourishment; and 2. Their saliva is,

against the order of Nature, constantly determined to other emunctories, so that it will, sooner or later, produce cutaneous, and painful diseases.

Chewing-Ball for horses, a kind of medicated bolus, for restoring a proper appetite : it is prepared of asafœtida, liver of antimony, bay, or juniper-wood, and the pellitory of Spain ; which, after being dried in the sun, and wrapped in a strong linen-cloth, are fastened to the bit of the bridle, in order to induce the animal to chew the bag. Such balls, it is said, may also be made of Venice treacle, and successfully used for the same purpose. See *Ball*, *Horse-ball*.

[CHICORIUM INTIBUS. A species of Endive, which, by the experiments of Mr. Wakefield and others in England, seems of prodigious consequence for the supply of summer feed. It has been sown broad cast, but appears to answer best in drills. It has yielded from 20 to 40 tons of green fodder per acre. In America it would be particularly suitable for summer feed, as the roots seek nourishment from a great depth.

This root is perennial and has generally been regarded in the light of a noxious weed ; it has, however, for several years past been cultivated in France as food for cattle. In Lombardy, it is sown, mixed with other herbs of pasture, and cut three or four feet high. It is reputed there to encrease both the milk and flesh of cattle, and to be very nutritious when made *into hay*. Horses eat it greedily ; and it is an important object for summer soiling both for them and cattle.... It is also freely eaten by sheep.

Chicory defies drought, being of early growth. The stalks are so thick and stiff as to support themselves against winds and the heaviest rains. The most severe cold does not injure it. The quickness of growth renders it very valuable, because it furnishes abundance of salutary fodder at a season when green food is scarce. It has been found to grow seven inches in three weeks, whilst sainfoin and burnet grew only four inches. Two cuttings may be made of it the first year, and three or four according to the season every year after, in May, July, August, and October, or in May, July, and October, never letting it stand till it become hard and sticky : or it may be cut continually, by beginning again when the whole piece is gone over, and thus yield a constant supply of fresh food during seven or eight months.

The produce is said to be superior, upon the whole, to that of Lucerne, in the proportion of three to one. A piece of ground sown with chicory, was found to yield, by the acre, the year of sowing, at two cuttings, July the 24th, and Oct. the 17th.....19 tons, 4 cwt. Second year, at three cuttings, May 21st, July 24th, and December 3d.....38 tons, 9 cwt. And the average produce of four years, was near thirty tons.

The quantity of seed produced on an acre has been, the first year, an hundred and an half ; the second, two hundred weight, and the third, from three hundred and an half to four hundred and an half.]

The leaves of chicory, when *blanched*, form an ingredient in early spring salads [in England], and if this plant be cultivated in a light, and somewhat moist soil, they will be divested of their bitterness...... The roots are moderately bitter : if gathered while young, they may

be eaten among other vegetables.

In its medicinal properties chicory is cooling.

CHICK, or CHICKEN, the young of the gallinaceous order of birds, especially of the common hen.

From the importance of this bird, as constituting a delicate and agreeable food, especially to invalids, the means of hatching, and rearing it, have long exercised the ingenuity of speculators. We shall however, confine our present account to those modes only, which are the most simple, and have been attended with the greatest success.

The manner in which they are hatched in ovens, by the Egyptians, is too well known, to require a detailed description: by this contrivance, six or seven thousand chickens are produced at one time...... these, as the spring is uncommonly mild, being indeed much warmer than our summer, will thrive without "*clutching*." Similar success has attended the experiments of M. Reaumur. In order to remedy the severity of a northern climate, that would have otherwise destroyed the chickens as soon as hatched, he resorted to an expedient, which he called "a woollen hen," namely, he put them in a warm basket, and covered them over carefully with dry animal wool.

Another method of hatching and rearing chickens, we shall extract from the 13th volume of "*Dodsley's Annual Register*" (for 1770, p. 105, Chronicle). It was laid before a learned society, by a gentleman, to whom a gold medal was awarded for his contrivance....The chickens should be taken away from the hen, the night after they are hatched, and be re-placed with new eggs, on which she will continue to sit, for a second and third brood. When first removed from the hen, they are to be fed for a fortnight with eggs, boiled hard, chopped fine, and mixed with bread, in the same manner as larks and other birds are reared. After this period, they are to be supplied with oatmeal and treacle, so mixed as to crumble; a food of which the chickens are so fond, and thrive so rapidly, that, at the end of two months they will be as large as full grown fowls......We apprehend, however, this ingenious method would render the chickens more expensive, than we can purchase them in the most extravagant London markets: hence it appears to be calculated only for the curious and speculative epicure. See Egg and Hen.

CHICKEN-POX, or Swine-Pock, *Varicella*, is a disorder in itself of so little consequence, that we should not have mentioned it, if this affection were not frequently confounded with the Small-Pox.

The chicken-pox generally appears without any previous illness; though, in some cases, chillness, cough, loss of appetite, and a slight fever, precede it, for two or three days. On the first appearance of the eruption, the pustules are of a reddish hue; and, on the succeeding day, small vesicles are formed at the top of the former, containing a colourless, or sometimes yellowish, watery fluid. On the third day, the pocks arrive at maturity; after which they gradually die away, leaving a slight scab, which, however, does not extend to the true skin, and produces no mark. This cutaneous affection is seldom attended with serious indisposition, so that medicines are but conditionally required, and often unnecessary. A few drops of antimo-

nial wine may, nevertheless, be advantageously given, in order to excite a more speedy and uniform perspiration, and consequently to promote recovery.

CHICKLING VETCH. See VETCH.

CHICKWEED, or *Alsine*, L. a genus of plants, comprising five species, of which that most generally known in England is the *media*, or common chickweed.

It grows in almost every situation, whether damp or even boggy woods, or the driest gravel walks in gardens. In its wild state, this plant frequently exceeds half a yard in height, and varies so much from the garden chickweed, that if a person were acquainted only with the latter, he would with difficulty recognize it in the woods. On account of its upright flowers, which blow from March to October, it may be considered as a natural barometer; for, if they are closed, it is a certain sign of approaching rain; while, during dry weather, they are regularly open, from nine o'clock in the morning till noon.

This species affords a striking instance of what is called the *sleep of plants*. Every night the leaves approach in pairs, so as to include, within their upper surfaces, the tender rudiments of the new shoots: and the uppermost pair, but one, at the end of the stalk, is furnished with longer leaf-stalks than the others, so that it can close upon the terminating pair, and protect the end of the branch.

Swine are extremely fond of chickweed, which is also eaten by cows and horses, but is not relished by sheep, and is refused by goats. It likewise furnishes a grateful food to small birds, and young chickens: its tender shoots and leaves, when boiled, can be scarcely distinguished from early spinach, and are in every respect as wholesome. They are reputed to be refrigerating and nutritive food for persons of a consumptive habit.

CHILBLAIN, in medicine, is a small tumor, or ulcer, in the hands, feet, heels, &c. It is occasioned either by exposing warm parts too suddenly to a cold temperature; or by holding the hands, or feet, when extremely cold, too precipitately to a considerable degree of heat. Such affections always have a great tendency to mortification, in which they frequently terminate.

Children of sanguine habits, and delicate constitutions, are most liable to chilblains; which may be prevented by such remedies as invigorate the system; by wearing flannel socks, from the beginning of September, to the latter part of spring, and occasionally taking gentle laxatives, when they are disposed to become costive. All these precautions, however, will be attended with no benefit, if young people are suffered to repair to the fire, immediately after coming from the most severe external cold.

In the commencement of this painful complaint, the cure is easy: immerse the part affected, several times a day, for a few minutes, into cold water, and guard against sudden vicissitudes of heat and cold; as either are equally hurtful. But, if simple water procure no speedy relief, dissolve an ounce of salt-petre in half a pint of vinegar and an equal quantity of water, and foment with it the part affected every night. When the

tumours will not yield to these applications, and still remain in a swelled and painful state, without producing ulceration, a few drops of the pure tincture of *benzoin* may be rubbed occasionally on them; and the parts should be defended against the external air, by soft linen cloaths: from this simple treatment, we have experienced the best effects.

CHILD, a term of relation to parent; but also metaphorically applied to adults, expressing either simplicity, or imbecility. We shall consider it only in the former sense.

As the *physical education* of *children*, in its different branches, would require a greater portion of room, than can be devoted to it in an alphabetical work; and as this subject has been amply discussed in a work, just published from the German of Dr. STRUVE, we shall, in this place, give a few hints, relative to the *moral* duties of children to their parents. Having incidentally treated of various subjects, not less connected with the bodily prosperity of youth, than that of adults, and resuming others in alphabetical order, we venture to hope, our readers will approve of this arrangement.

The obligations of children to their parents, arise from a principle of natural justice and retribution. To those who gave us existence, we instinctively owe submission, and obedience, during our minority, as well as gratitude and reverence ever after; those who protected us in the weak state of infancy, are justly entitled to our protection in the infirmity of their age: those who, by nurture and education, have enabled their offspring to prosper, ought reciprocally to be supported by that offspring, if unfortunately they should stand in need of assistance. Upon this self-evident principle are established all the filial duties enjoined by positive laws. And, although by the statutes of this country, an *illegitimate* child appears to be exempt from such obligations towards its parent; yet we find, that, in cases of *legal* issue, the tie of nature is not dissolved by any misconduct of the parent; and consequently a child ought equally to defend the person, or maintain the cause, or suit, of a bad parent, as of a virtuous one; and is alike compellable, if of sufficient ability, to maintain and provide for a wicked and unnatural progenitor, as for one who has shewn the greatest affection, and parental piety....It does not behove us to comment upon the consequences of these injunctions, nor shall we attempt to reconcile them to general principles of equity, but submit this arduous task to the wisdom of our legislators.

With respect to the management of children, in the early stages of life, we refer to the article INFANCY.

CHIMNEY, in building, is that part of a house, where the fire is made; and which is provided with a tube, or funnel, to carry off the smoke.

Notwithstanding the magnificence of the Grecian and Roman architecture, it is very doubtful whether their common dwelling-houses had chimnies; for they made use both of stoves, and holes cut in the roofs of their houses, to admit the free egress of smoke. But as VIRGIL mentions chimnies, we may infer, that they were not wholly unknown to the ancients.

Method of Building Chimnies that will not smoke: Masons have

adopted different methods of drawing up the funnels of chimnies, generally regulated by their own fancy and judgment, which are often influenced by local customs: hence they are seldom directed by sound and rational principles. It frequently happens, that the smoking of chimnies is occasioned by their being carried up narrower at the top than below, or in a zig-zag form, or in angles; indeed, in some instances, this is owing to accidental causes; but, for the most part, it must be attributed to those above mentioned. When chimnies are constructed in a pyramidal or tapering form, especially if the house be of a considerable height, there is much reason to apprehend that they will smoke: the air of a room being rarefied, is forced into the funnel of the chimney, and receives from the fire an additional impetus to carry up the smoke. Thus it is evident that, as the smoke ascends, the impelling force is lessened; it moves slower, and consequently requires a greater proportion of space to circulate through; whereas, in the usual way, it has less room, from the sides of the chimney being gradually contracted.

Although this method of constructing chimnies may not meet with general approbation, because it is supposed that the wider a chimney is at the top, the more liberty the wind has to blow down; yet, on the other hand, it is obvious that, from the structure of the chimney, and from other causes, the wind, having no resistance to overcome, must necessarily return, and thus facilitate the free egress of the smoke. In the usual manner of building pyramidal chimnies, when a current of air rushes downwards, the wind and smoke are in a manner confined, and as the resistance is less from below, the smoke bursts out into the room. Hence the reverse method before suggested, has proved effectual, after every other expedient had failed, and even in a house, standing in the most disadvantageous situation, namely, under a lofty mountain to the southward, from which blasts were blown down upon it. A vent was carried up without angles, as perpendicular as possible, being made several inches wider at the top than at the bottom; the funnel was contracted in a throat directly above the fire-place, and widened gradually upwards. Since that time, the house has not only ceased to smoke, but, when the doors stand open, the draught is so strong that it will carry a piece of paper up to the top of the chimney. The advantage of erecting chimnies after this mode, are so evident, that we venture strongly to recommend its adoption; for, independently of their being exempt from smoking, and contributing to purify the atmosphere, by the rapid current of air continually circulating through the apartment, it will prevent large quantities of soot from accumulating, and consequently remove every apprehension of their taking fire.

Various other experiments have been made, with a view to prevent or cure smoky chimnies: of these we shall enumerate only the two following, which deserve particular notice. The first is, not to suffer the height of the mantle to exceed one-third of that of the room, and to carry the jaumbs and breast upright, at least to the ceiling, when they should be turned or sloped as easily and gradually as possible.

The jaumbs from the hearth to the mantle should describe the form of a curve; and the lower part of the mantle, a broad horizontal plane; the distance from the inside of the breast to the back, on each side of the throat being from ten to fourteen or sixteen inches, according to the size of the chimney. This mode of reducing smoky chimnies, we are informed, has repeatedly been found successful.

Another method, which is attended with but little expence, consists in setting the grate, if a Bath stove, eleven or twelve inches distant from the fender; and in cutting away the back of the chimney, so as to leave a space of two inches between the back of the grate, and that of the chimney. If the grate be of the common form, the sides should be filled up with brick-work, and faced with Dutch tiles. By this construction, the air that passes behind the back of the grate will impel the smoke with an increased velocity, and thus prevent it from bursting into the room.

Smoky chimnies are frequently occasioned by their being so very narrow as scarcely to admit the children, usually employed for purpose of sweeping them, to reach properly to the top. This evil may be remedied, and that inhuman practice rendered unnecessary, by adopting the following mode, which has been used for time immemorial in Edinburgh, Glasgow, and other cities in the North; and which effectually answers the end intended.

Procure a rope for the purpose, twice the length of the height of the chimney, to the middle of which is to be tied a bush (of broom, furze, &c.) sufficiently large to fill the chimney. Put one end of the rope down the whole passage; and, if there be any windings in it, a bullet, or round stone, is to be tied to the extremity of the rope, and the wood-end of the bush introduced after the rope has descended into the chamber, where a person must pull it downwards. By the elasticity of its twigs, the bush sweeps the sides of the chimney as it descends, and carries the soot with it. Should it be necessary for the man at the top, who has hold of the other end of the rope, to draw the bush up again, the person below must turn the latter, so as to send the wood-end uppermost, before he gives notice to the assistant at the top to pull it upwards. Chimnies thus cleaned, never require one-tenth part of the repairs, rendered necessary where they are swept by children: for, as these are obliged to work themselves up, by pressing their knees and feet on one side, and their backs on the other, they not unfrequently force out the bricks that divide the chimnies. This is the chief cause why, in many houses of the metropolis, a fire in one apartment always fills the adjoining ones with smoke, and sometimes even the neighbouring house. *Whole buildings* have often *been burnt down*, from this concealed cause; as a foul chimney, taking fire, communicates it by these apertures to empty apartments, or to such as were filled with lumber; and in which it was thought unnecessary to make any search, after the fire had been extinguished in the chimney where it first began. We, therefore, seriously recommend this practice to be universally adopted, as an object of interest, not less than on account of its humane tendency. It would, farther, be no detriment to those who pro-

cure their subsistence by the sweeping of chimnies: for, if this plan should be countenanced, they would be as necessary, then, for the convenience of the public as they are at present; and those very persons would be unavoidably induced to provide themselves with ropes for that purpose. Lastly, such a beneficial change might afford the only practicable means of rescuing many unfortunate children from their degraded situation; prevent many accidents by which they become deformed; and obviate the evils attendant on a premature old age. [SEE FIRE PLACES.]

[Chimnies lined with mortar, in which salt has been mixed, it is said, will not retain soot. This was a discovery of a countryman in New-Jersey.]

Among the treatises published on this subject, besides those contained in Count RUMFORD's *Experimental Essays*, we shall mention only Mr. DAVID PORTER's *Considerations on the present State of Chimney-sweepers*, published some years since; and Mr. THO. DANFORTH's pamphlet, entitled *The Theory of Chimnies and Fire-places investigated, &c.* (8vo. 1s. 1796.) The latter is an ingenious, but the former is a practical and valuable essay, which, together with another on the same subject, Mr. PORTER has printed at his own expence, and distributed *gratis* for the benefit of the public; a liberality not common to authors.

CHINA. See PORCELAIN.

CHINCOUGH, or Hooping-cough, a contagious disease, which at first resembles a common cold, though it is from its commencement attended with a difficulty of breathing; and the eyes are protruded from their sockets. It generally attacks children; to whom, if mismanaged, it frequently proves fatal. Hence the necessity of parents to pay unremitting attention to those circumstances which aggravate the complaint....But, if the cough become so violent that respiration is occasionally suspended, and when the patient breathes again, is accompanied with a shrill hooping noise, no time should be lost to remove him to a different air, whether it be more or less pure, provided it is at some distance from his former residence. The diet in this disorder should always be light, but nourishing; and if no fever prevail, white meat may be allowed in very moderate quantities, so as to divide the usual dinner into three or four different portions, and to give neither cold nor hot drinks, but toast and water, with a little white wine, of which the chill is taken off; gruel; decoctions of sago, tapioca, arrow-root, &c. If the cough be attended with febrile symptoms, medical advice should be procured; but in ordinary cases we would advise a gentle emetic, made of an infusion of chamomile flowers, gradually administered; and afterwards to apply the following liniment to the pit of the stomach: Take one scruple of tartar emetic, dissolve it in two ounces of spring water, and add half an ounce of the tincture of cantharides. This embrocation was originally prescribed by Doctor STRUVE, and has, from experience, been found of superior efficacy to the patent or quack medicines advertised in the daily papers. A tea-spoon full of it ought every hour to be rubbed on the lower region of the stomach, with a warm piece of flannel; and the wetted part should likewise be covered with flannel. A gentle

previous vomiting, however, is necessary to promote the absorption of the linament.

In th beginning of the hooping-cough, especially after a change of air, great advantage has often been derived from the application of the juice of onions, horse-radish, or other stimulants, to the soles of the feet....See BLISTER.

Should febrile symptoms attend this complaint, and the child be strong, the loss of a little blood will be highly useful in moderating the violence and frequency of the cough. Purges of calomel and rhubarb or jalap, are also very proper, to be occasionally administered. During the operation of these remedies diluting drinks ought to be given. A gentle emetic of vinegar of squills sweetened, given early every other morning, for several days, will tend greatly to moderate the violence of the cough. Children bear the operation of emetics in a surprising manner in this disease. In the decline of the disease, generous diet, riding in a carriage, together with the use of *lac ammoniacum*, and Peruvian bark are highly useful. A plaister of Burgundy pitch applied between the shoulders is also beneficial in moderating the cough. Three or four drops of *laudanum* given twice a day in a spoonful of mint water, produce a good effect in the decline of the complaint, by abating the cough, which sometimes continues merely from habit, A *change of air* is indispensibly necessary to moderate the violence of the cough.

[CHINQUAPINE. See CHESNUT.

CHIONANTHUS, *Snow-drop* or *Fringe-tree*. A genus of plants comprising four species, of which only one is a native of the U. S. This plant, the *C. Virginica*, is common in several of the States, and rises to the height of fifteen or twenty feet, spreading into many branches, covered with a light coloured bark. The leaves are large, oblong, and entire; placed nearly opposite. The flowers are produced in May, towards the extremity of the shoots of the former year, hang in long bunches, and are of a pure white, whence the name *snow-drop*, and from the flowers being cut into narrow segments, it has obtained the name of *Fringe-tree*. When the flowers are fully grown, the tree makes a very handsome appearance. After the flowers have fallen, oval berries appear, of a livid blackish colour, when ripe, each containing one hard, oblong, pointed seed. The bark of the root of this shrub, Mr. Marshall says, bruised and applied to fresh wounds, is esteemed by the natives a specific in healing them without suppuration. The *Chionanthus V.* has several varieties.

CHIRONIA ANGULARIS, common American Centaury. This plant is a native of the United States and has the appearance of lesser centaury, (Gentiana Centaurium.) In Pennsylvania it is constantly called centaury; and is deservedly esteemed a highly medicinal, and very agreeable simple bitter....... It is used with great success, in relaxations of the stomach, loss of appetite, and general debility. In sickly situations, an infusion of this plant, joined with *calamus aromaticus*, is an excellent medicine, taken early in the morning.]

CHLOROSIS, a disorder which frequently attacks females after the age of puberty. It is attended with a depraved appetite, and a desire to eat substances that are not

food, such as chalk, ashes, salt, &c. the skin is pale and discoloured; the face sallow or greenish, but sometimes of a livid hue; there is a deficiency of blood in the veins; with a soft swelling of the whole body, especially the legs during the night; debility; palpitation; and suppression of catamenia.

Causes....A sedentary life; scanty, or indigestible food; obstructions of the bowels; and frequently also, inordinate passions.

Cure....Although the experience of all ages has attested, that the most certain relief in this female complaint is a change from a single to a connubial state, yet as this expedient is not always convenient, the following plan should be steadily pursued: A nourishing diet, with an allowance of generous wine, in small quantities; abstinence from acids, spirituous liquors, and whatever may suddenly heat or cool the body; moderate daily exercise, especially on horseback; or, if that cannot be procured, general friction of the whole frame with warm flannel every morning and evening; sleeping on mattresses, instead of soft feather beds; early rising, and cheerful company. Beside these general regulations, it will be useful to keep the bowels continually open, by taking small doses of vitriolated tartar, a scruple or half a dram, to be repeated four or six times when necessary in one day; to bathe the lower extremities frequently in warm water, and to wear worsted stockings in preference to silk or cotton, to apply the steam of hot water with due precaution; and lastly, to resort to the tepid bath every other day, or as often as is compatible with the strength of the patient....If, nevertheless, these gentle means prove unsuccessful, the more powerful remedies, such as chalybeates, bitters, mercurials, &c. must be prescribed by the profession....In some of the most tedious and inveterate cases of chlorosis, almost immediate relief was obtained by inhaling dephlogisticated air, or oxygen gas, which, however, should be administered only by persons sufficiently acquainted with the nature of that powerful agent.

[Although *Chlorosis* is frequently attended with the appearance of general dropsy, it is easily discriminated from that disease: there is no diminution of urine; frequently that secretion is in great quantities, and limpid. Sometimes chlorosis is accompanied with cough, which, joined to the difficulty of breathing, affords a suspicion of hectic, but it is not attended with the fever and flushing of the cheek, which mark the disease.

Supposing the disease to be ascertained, if there be turgescence of the belly and costiveness, a gentle purgative of aloes or rhubarb may be premised; and the use of chalybeates commenced. The best form of this medicine, is that called *prepared steel*, which is no more than simple rust of iron. The following prescription may be taken with great advantage. Prepared steel, 1 oz. Powder of P. bark. ½ oz. mix and divide into 12 doses, one of which may be taken morning and evening, in syrup. The same composition may be taken in the form of pills made up with *syrup of rhubarb*, two to be taken three times a day.

Exercise on horseback, and early rising, are indispensible remedies in this complaint. The air and scenes ought to be changed. The mineral waters of Bristol, Penn-

sylvania, and also those of Scooley's Mountain in Sussex county, New-Jersey, joined with the fine air of that elevated spot, have done much good in this complaint.]

CHOCOLATE-TREE, *Theobroma Cacao*, L. is a native of the W. Indies, and S. America, attaining the height of 16 feet: From the fruit of this tree Chocolate is thus prepared: The nuts are gently parched, to separate their external covering; the kernels are triturated on a smooth warm stone, and a little anatto is added. When sufficiently triturated, it is put quite hot into tin moulds, where it congeals in a very short time. This is the common chocolate, as prepared in England from the cocoa alone, without any other ingredient. Sometimes, however, a small quantity of sugar, or of vanilla is added, for improving its taste. As these cakes are very liable to contract good as well as bad scents, they should be carefully wrapped up in paper, and kept in a dry place.

Good, unadulterated chocolate, ought to possess the following properties: a brown colour inclining to red, and rather lively than faint; a smooth surface not affected by mere contact of the hand; a fine and uniform consistence on breaking it, without any granulated particles, which arise from the addition of sugar, employed by the manufacturer to conceal still baser ingredients; lastly, it should easily melt in the mouth, and leave no roughness or astringency, but rather a cooling sensation on the tongue....This last quality is the most decisive criterion of genuine chocolate.

Among the various experiments made with the view of discovering substitutes for the expensive nuts of the cocoa, in the preparation of chocolate: none has hitherto *completely* succeeded. The Germans employ sweet almonds, as well as the blanched, dried, and roasted kernels of the hazel, and wall-nut, for this purpose; and Mr. MAARGRAFF procured a quantity of oil from the fruit, or kernel, of the lime-tree, which he formed into a paste, resembling chocolate, but it differed much from it, both in taste and flavour.

Considered as an article of diet, chocolate is a nutritive, and, in general, wholesome food, well adapted to the weak stomachs of invalids and valetudinarians. If duly prepared, and not too much roasted in the nuts (which imparts a dark, rather than reddish colour to the cakes), it is easily dissolved in a liquid state; and, being quickly assimilated to alimentary matter, it is less flatulent, and oppressive, than most vegetable dishes of a viscid, and oily nature. To promote its digestion, it ought not to be used without the addition of aromatic spice, such as cinnamon, cardamoms, vanilla, &c. which last, however, must be sparingly employed as it is one of the most heating, and stimulating drugs.

[The Spanish chocolate has been long famous for its superiority over that of every other part of the world. Two causes may conspire to establish this superiority. 1. The richness of the nuts, which are obtained from the province of Caraccas, and 2. The care taken in the manufacture. The following is the receipt by which the Spanish chocolate is made: To six pounds of nuts, add $3\frac{1}{2}$ lbs. sugar, seven lbs. of vanilla, and $1\frac{1}{2}$ lb. flour of Indian

Corn (zea mayz), $1\frac{1}{2}$ lb. of Cinnamon, 6 cloves, one dram, (60 grs.) of capsicum (long pepper); a sufficient quantity of rou-cou nut to improve the colour, and ambergrease or musk to give an agreeable flavour.

In the common way, to 17 lbs. of nuts, are added 10 lbs. sugar, 28 pods of vanilla, one dram of ambergrease, and 6 oz. cinnamon. The ambergrease and musk, may be safely omitted.

Chocolate, it is well known, constitutes the breakfast and supper of two-thirds the Spanish nation, and it is to be regretted that it is not more used in the United States. During the winter, it certainly is a preferable breakfast to coffee, both in respect to the labour, which it will enable a man to perform, from the stimulus or temporary strength it affords; and also from the nourishment which it communicates to the system. When properly boiled with milk, it certainly is preferable to any other breakfast.

As chocolate disagrees with many stomachs, it may be proper to observe, that the shells of cocoa when boiled in water, (after being washed), with the addition of milk, form a very pleasant article of diet.

CHOLERA MORBUS: a violent vomiting and purging. This is a common disease in the U. S. during the summer months, and most commonly proceeds from an intemperate use of spirituous liquors, improper articles of diet, taken in the evening for supper, or exposure to night air, while sleeping thinly covered.

If the discharges be not very violent, they ought to be encouraged by *moderate* draughts of warm water, or weak chamomile or centaury tea (*Chironia Angularis*), when the offending cause (if the disease proceed from bad food) is removed, ten or fifteen drops of laudanum may be given in water every fifteen minutes, until ease be procured. If spasms in the stomach and legs occur, as they sometimes do, a tea-spoonful of æther may be given in a wine-glass of water, taking care not to approach the candle with the medicine. The legs must also be well bathed with laudanum, and rubbed with a flesh-brush. Clysters of warm water and molasses ought also to be injected every hour for three or four hours, to evacuate the bilious effusions which commonly take place in this complaint. Great care ought to be taken to avoid sleeping with the windows open, for the temperature of the air frequently diminishes fifteen or twenty degrees, during the night, after a warm day. [See DIARRHAEA and VOMITING.

CHRISTOPHER, the HERB, or *Actæa spicata*, L. is an indigenous plant, growing in woods and shady places. It is perennial, attains the height of about $2\frac{1}{2}$ feet; flowers in the months of May, or June; and produces black, shining, pulpy berries in autumn, about the size of peas, which are considered as poisonous.

On account of its fetid smell, this plant is said to be frequented by toads: it is, nevertheless, eaten by sheep and goats, but refused by cows, horses, and swine. [See ACTAEA SPICATA.]

CHRONICAL DISEASES are in general, neither attended with fever, nor any other symptoms portending a speedy termination of

the complaint; and, in this sense, they are opposed to *acute*, or inflammatory disorders. Physicians find no small difficulty in drawing a precise line of distinction between these affections; as the latter often change into those of a *chronic* nature.

TISSOT derives the origin of inveterate diseases from the following sources: 1. Debility of the solid parts of the body, either hereditary, or induced by adventitious causes; 2. Defective digestion, and weakness in the stomach; 3. Improper treatment, and imperfect resolution, of acute diseases; and 4. Too great irritability, and other affections, of the nervous system.

From this view of the *causes*, and the corresponding evidence of medical practitioners, it cannot be doubted that chronic maladies are not only the most complicated, but also the most difficult to be removed: Proteus-like, they appear under a thousand different forms, often exhaust the fortitude of the most patient, baffle the united efforts of the Faculty, throw the unhappy person into a state of despair, and deliver him over to all the artifices, and cunning of ignorant pretenders, who impose upon the credulous victim, and close the scene of his delusion!

On the contrary, in acute diseases, Nature, though violent in all her efforts generally points out the way, in which she *may* be assisted: in short, the *cautious* physician, who has had a moderate share of experience, will here seldom fail to procure the desired relief. If his prescriptions be scrupulously attended to, a few appropriate doses, in a vigorous constitution, will produce all the good effects which may be attained by art. But in chronic affections, medicines generally operate slowly, and often in a manner very different from what experience entitles us to expect.... Hence the precarious nature of *drugs* has become almost proverbial; not because they are in themselves inert (which would involve a contradiction); but because they were improperly, or injudiciously, applied.

Such being the case in all those inveterate affections, which torment mankind, it is matter of just surprize, that the attention of the afflicted, as well as the scientific, has not been more generally directed towards discovering effectual means of relieving the unhappy, instead of such as have but too often eluded the most sanguine hopes of the patient, and detracted from the reputation of the physician. If it be admitted that, in chronic distempers, the whole animal frame is under a *slow*, though certain, influence of disease; that the system, in all its functions, requires a very different action, or stimulus, from that generally produced by *medicines*, or particular organs; and that so favourable a change can be effected only by operating on the different processes of digestion, assimilation, absorption, and respiration, not *separately*, but *conjointly*; then we may venture to affirm, that the *prevailing* plan of treating those obstinate maladies is established upon a very precarious basis.

Novel as this assertion may appear to many of our readers, it is nevertheless *true*; and though it may, at first, meet with opposition, like most of those general truths which all acknowledge, but few will defend or practise, there is every reason to trust to the good sense

of mankind, that empiricism and knavery will *gradually* vanish from the tablets of history.

In order to approach with our labours towards a plan of so beneficial a tendency, we have, on all proper occasions inculcated the necessity of attending to that most important department of medicine, which treats of *diet* and *regimen*. From these *alone*, the most essential advantages may be derived in ALL chronic diseases, especially such as cannot be traced to their *sources*, or the *predisposing* causes of which cannot be discovered, either from an intentional concealment of the patient, his want of resolution and capacity to disclose them, or other reasons, chiefly arising from the present imperfect state of the healing art. Hence, the writer of this article has, for many years, been sedulously employed in collecting and arranging facts, towards a new work, in which he proposes to lay before the public an outline of the treatment to be adopted in a diseased state of the body; and which will form a counterpart to his former "*Lectures on Diet and Regimen*." At present, it will be sufficient to point out the principal rules, by which the conduct of such persons, as are the victims of inveterate afflictions, ought in general to be guided.

1. When the patient is not confined to his bed, *gentle* and *frequent exercise* will be salutary; but all violent commotions, whether of mind or body, are extremely prejudicial, and cannot fail to retard his recovery.

2. The sick-room ought to be lofty and capacious, frequently ventilated by opening the door or windows, without admitting a draught of air; and, in damp weather, the apartment cleared of foul, mephitic vapours, either by mild aromatic fumigations, or more effectually, by the steam of vinegar. For the same reason, all soiled linen, as well as the night-chair, &c. should be immediately removed; the bed frequently made; and an assemblage of persons never suffered to vitiate the atmosphere of a patient's room.

3. Let the *temperature* of the air be *cool* rather than warm; yet this general rule may admit of exceptions in particular cases: only a moderate degree of warmth should, likewise, be allowed with respect to the bed-clothes, and especially the covering, which ought to be soft and light. When the strength of the patient permits, he should be encouraged to rise, and spend part of the day, sitting either in bed or on a chair; but carefully avoiding a draught of air, or taking cold: hence he should not too suddenly venture to leave the house.

4. In regard to *food*, he must abstain from crude and heating animal flesh, such as bacon, ham, boiled beef, hard eggs, &c. from dry, flatulent, acrid, salted, and such provisions as increase the bulk of feculent excretions. Thus, white meat in the most frugal portions, blended with vegetables of a mucilaginous and nutritive kind, such as cauliflower, asparagus, parsnips, scorzonera, &c. as well as light dishes of rice, barley, or oatmeal, in a liquid rather than solid form, and particularly baked or roasted apples, will be found the most conducive to health. In certain cases, however, raw fruit may be abundantly allowed; but the patient must never eat any food against his appetite; and, if, during the crisis of a disease, he should express a strong desire for a particu-

lar dish, no prudent physician will object to the gratifying of this natural inclination, unless the substance claimed be obviously possessed of hurtful qualities.

5. In the article of *drink*, a chronic patient cannot be too cautious. In general, he ought to give the preference to simple, pure water, or ptisan made of pearl-barley and currants; or whey; toast and water; or this fluid acidulated with the juice of lemons or vinegar, and sweetened with sugar or honey. All spirituous liquors are, in general, unnecessary and detrimental, unless required from particular circumstances.

6. The important process of *perspiration* also deserves to be duly regulated: every time the patient has profusely perspired, he ought to change his linen, which should be previously warmed; and, if there prevail no peculiar irritability in the system, flannel will always be found the most beneficial dress next the skin.

In short, every object, tending to alarm or disturb the patient, should be carefully removed; his sleep rendered as quiet and comfortable as possible; and, if his strength and appetite begin to improve, he ought to redouble his attention, both as to the time and manner of taking muscular exercise, not less than to his mental exertions, as well as with regard to the gradual change of the quantity and quality of his aliment.

CHRYSALIS, or AURELIA, in natural history, is a term expressing that form of butterflies, moths, chafers, and other insects, which they assume, while in a state of rest and apparent insensibility; before they arrive at their winged or most perfect state. This transformation, says HERDER, a celebrated German author, affords a beautiful emblem of man's passage to a future life.

The form of the chrysalis generally approaches that of a cone: while the creature is in this state, it appears to be destitute both of legs and wings, to have scarcely power to move; and, in short, to be almost devoid of life. It takes no nourishment, nor has it indeed any organs for that purpose: its posterior part is all that seems animated, which has the power of motion, in a very slight degree. The external coat of the chrysalis is cartilagineous, of a considerable size, generally smooth and glossy, though some of them have a few hairs, while others are as hairy as the caterpillars from which they are produced; and again, others are rough, and in a manner shagreened.

When first produced, the chrysalis is soft, and the front of it moistened with a viscous liquor, which surrounds the wings, legs, &c. as it hardens almost immediately, all those limbs that were before separated, are consolidated into a mass. Having undergone its change, in this state, it perforates the shell with its head, and bursts forth into day, in its winged form. See BUTTERFLY.

As this admirable part of the animal creation has, hitherto, been almost entirely neglected by economists, though it has always excited the attention of the curious naturalist, we have inserted the preceding concise account, to remind the ingenious inquirer, that even these apparently useless creatures may, perhaps, at some future time, become subservient to important purposes. See CATERPILLAR.

CHUB, or *Cephalus*, L. is a species of the *Cyprinus*, a numerous genus of fish. It is mostly found in holes overshadowed by trees, where these fish are seen floating during warm weather, in great numbers.

Chub being very full of bones, afford but an indifferent dish; yet they furnish considerable amusement to anglers, as they may be easily taken. The best mode of fishing for them is the following: Prepare a very strong rod of sufficient length, and fix to the hook a grasshopper, beetle, or any other large fly. This must be dropped gently at a small distance from the fish, which will bite immediately, if it does not see the angler, who should take the precaution of concealing himself from it; as, being extremely timid, this fish sinks to the bottom, on the slightest alarm, and not unfrequently at the passing of a shadow. In March and April, it may be caught with large, red worms; in June and July with flies, snails, and cherries; but in the months of August and September, the proper bait is good cheese pounded in a mortar, with some saffron, and a small quantity of butter. The best season for this fish is winter, as the flesh is then more firm, and better tasted. During cold weather, the angler should keep his bait at the bottom, when it will be eagerly seized.

CHURN, a vessel in which butter, by long and violent agitation, is separated from the serous part of milk.

The inferiority of the churns in common use, has induced several ingenious mechanics to exert their skill in contriving others, that would render the process of making butter less tedious and expensive. Of [two of] these we shall give a succinct account.

The first is Mr. William Bowler's improved Churn, for which the Society for the Encouragement of Arts, Manufactures, and Commerce, liberally gave him thirty guineas, in the year 1795.

This churn is of the barrel kind, being a cylinder, 18 inches in diameter, and 9 wide; the sides are of wood, [tin would be better on account of the greater ease with which it may be cleansed] the rim a tin plate, which has two openings; one $8\frac{1}{2}$ inches in length, and 4 in width, through which the cream is poured into the churn, and the hand introduced for cleaning it; the other, a short pipe, one inch in diameter, by which the butter-milk runs out of the churn, when the operation is finished. The first of these openings has a wooden cover, fastened down by two screws; and the other a cork fitted to it, while the butter is churning. There is farther, near the larger opening, a small vent-hole, with a peg to admit the passage of any air that may be discharged from the cream, at the beginning of the operation. An axle also passes through the churn, terminating in two gudgeons, on which it hangs; its lower part being immersed in a trough, in order to hold occasionally either hot or cold water according to the season of the year. On the inside of the rim, are four projecting pieces of wood, with holes, serving to agitate the cream by the motion of the churn. This movement is caused by a pendulum 3 feet 6 inches long, that has an iron bob, weighing 10lbs. and at its upper end a turning pulley, 10 inches in diameter,

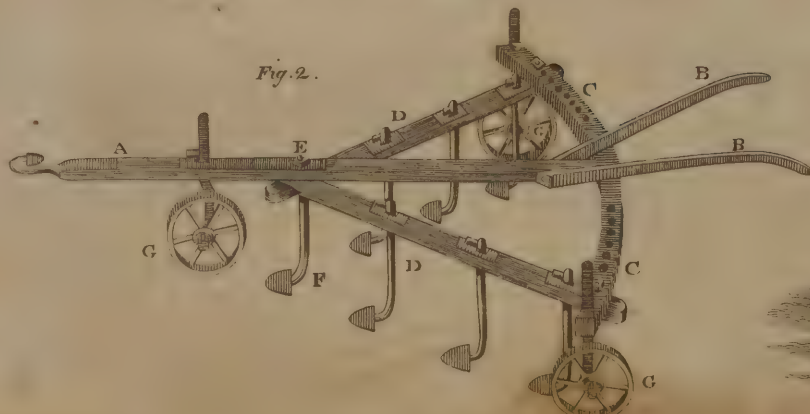
Wright's Churn.

Fig. 1.

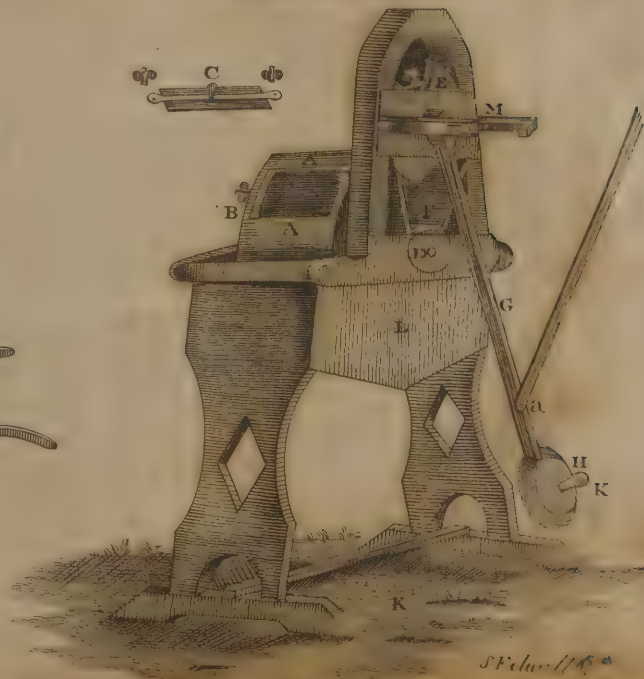
Fig. 2.

Lester's Cultivator.

Fig. 2.



Bowler's Churn.



from which a rope goes twice round another pulley, about 3 inches in diameter, fixed on the axis of the churn, which it causes to make a partial revolution, by each vibration of the pendulum.

There are likewise sliding covers to the machinery, and also another to the water trough; in order, when hot water is used, to secure the steam, and keep the cream in a proper degree of warmth. The motion of the pendulum is given, and continued, by means of a wooden rod, about 3 feet 9 inches in length, which turns on a pin 3 inches above the bob of the pendulum.

Explanation of the Engraving which represents Mr. William Bowler's improved Churn.

A. A. The body of the churn. [of tin.]

B. An opening, by which the cream is put in.

C. The cover of the large opening. The small hole on the opposite side cannot be delineated in the print.

D. The axis, or gudgeon, on which the body of the churn is suspended.

E. The upper, or large pulley.

F. The smaller pulley fixed on the axis of the churn.

G. G. The rod of the pendulum, hanging from the upper pulley E.

H. The bob of the pendulum.

I. I. The handle, moveable on the pin at *a*, by which the pendulum is moved, making a traverse in the form of the dotted line K. K.

L. The trough for the hot or cold water.

[To be made of tin because a better conductor of heat than wood.]

M. A projecting piece of wood, with a shoulder, which supports the handle I, when the churn is not at work.

As butter is often made in small quantities, and the vertical motion of the common churn is extremely fatiguing, we consider those methods of applying the powers of mechanism, as valuable improvements. Hence we presume to recommend the preceding improved butter-churns to be generally introduced; for the facility and expedition, with which butter is thus obtained, will amply compensate the additional expence.

[WRIGHT'S CHURN. This churn is made in the form of a cube, with vertical dashers, as a, a, a, a, a, a, a, a; B, the top that takes off; C, the handle by which the dashers are turned; D, D, D, D, the form of the churn each way; C, the spindle that goes through the dashers. Churns, agreeably to this form, are made by Wright and Co. Cherry-street, Philadelphia.]

Churning. As we have already discussed the subject of butter, and treated of the management of the dairy as connected with it, we shall only offer here a few supplementary remarks.

If a pump-churn be employed, it may be plunged a foot deep in a tub of cold water, and remain there during the whole time of churning; which will harden the butter in a considerable degree. This operation, as we have before observed may be much facilitated, by pouring into the churn a small quantity of distilled vinegar, which will produce butter in the course of one hour. Those who make use of a pump-churn, should endeavour to keep up a regular motion of the machine; and by no means admit any person to assist them, unless

from absolute necessity: for, if the churning be irregularly performed, the butter will in winter *go back*: and, if the agitation be more quick and violent in summer, it will cause the butter to ferment, and thus to acquire a very disagreeable flavour. ....Where there are many cows, a barrel-churn is preferred; but unless it be kept very clean, the bad effects of it will be soon discovered in the butter. Particular care should also be taken, to place it, in a proper temperature, according to the change of the season; that is, to fix it in a warmer situation in the winter; and, in the summer, to expose it to a free current of air.

Churn-Staff. See Wart-wort.

CHYLE, in animal economy, is that white fluid, produced from the nutritious part of the food, in the first passages, after the fibrous or feculent matter has been separated: it is chiefly generated in the milk-vessels of the mesentery, whence it passes to the receptacle of the chyle, situated under the left kidney, and is conveyed to what is called the thoracic duct, or the canal of the chest, from which it enters certain veins, where it is mixed with the *blood*; in short, it is the only supply of that *vital* fluid, and hence the great importance of wholesome food, from which alone a salubrious blood can be prepared, will be easily conceived. In this view only, we have introduced the word *chyle*: a liquor which resembles milk; has a sweetish-saline taste; easily coagulates; and consists of a mixture of oily, watery, and lymphatic parts (see Lymph); its milky colour arises from the combination of oil with water; an instance of which occurs in the milk of almonds.

As the chyle is, by nature, intended to form the blood, to supply the body with nutritious juices for the daily loss and waste it sustains, it is obvious that this salutary process ought not to be interrupted by violent exercise after meals; because the chyle is supposed not to be completely secreted, till about four hours after the food has been taken.

Dr. Darwin observes that, though the chyle, from different kinds of aliment, is very similar, and all the various constituent parts of animal bodies are ultimately produced from the chyle, by sanguification and secretion, yet it happens, that some kinds of aliment possess a greater quantity of these particles, than others: such materials, for instance, as already contain much sugar, mucilage, and oil, as the flesh of dead animals, or the fruits and seeds of vegetables.

CICELY, the Sweet, or great chervil, or shepherd's needle, the *Scandix odorata*, L. is a native plant, growing in orchards, hedges, and waste places, but generally near houses; and is chiefly found in the counties of Westmoreland, Cumberland, Lancaster, and Worcester. It is perennial, produces white flowers, which blow in the month of May or June, and seeds of a sweet and agreeable taste. The whole plant has an aromatic scent, and its seeds are used in the north of England, for polishing and perfuming oak-floors, and furniture: they also yield an essential oil, similar to that obtained from anise-seeds....The fresh leaves and stalks of the sweet cicely impart to wool a fine citron yellow dye, when prepared in a solution of bismuth; as asserted by Dambourney.

CHICORY, See wild SUCCORY.

CINNABAR, in natural history, is either native, or factitious. The former is an ore of quicksilver, moderately compact, very heavy, and of a beautiful striated, red colour. The latter is composed of six, or eight parts of mercury, to one of sulphur; the whole is sublimed, and thus reduced into a fine, red glebe. The best is of a high colour, and full of fibres, resembling needles; the chief use of cinnabar is for painting.

Formerly, the native cinnabar was much employed in medicine, as a sedative and antispasmodic powder, which is still vended in Germany, for the use of the ignorant, who take a dose of it after every alarm, or fright. But as this metallic substance contains arsenical particles, of which it cannot be cleared by repeated ablution, it frequently occasions nausea, trembling, and anxiety; which, however, subside after vomiting; ....We should not have mentioned this substance, had we not learnt from a pamphlet, published by Dr. LETTSOM, that a late famous Quack (whose son and widow now contend in the newspapers, for the authenticity of his prescriptions; and still trifle with the lives of unwary persons), administered the native cinnabar, in *red powders*, of which he kept *six* kinds, containing different proportions of this *pigment*, in order to deceive the patients by a greater variety of colours....When will this outrage on humanity terminate?

CINNAMON, is the bark of the true cinnamon tree, or *Laurus cinnamomum*, L....but an inferior sort, which is often sold for genuine, is collected from the base cinnamon, or *Laurus Cassia*, L. See BAY-TREE.

Cinnamon is one of the most agreeable, and useful aromatics: it is more grateful both to the palate and stomach, than the generality of spices. It cannot, however, be doubted, that it is more heating and stimulating, than its common substitute, cassia-bark; hence the latter is better adapted to culinary uses, especially for the young and phlethoric, than the real cinnamon, which deserves the preference in medicine; and here it is of considerable service in alvine fluxes, arising from relaxation, and other immoderate discharges.

CINQUEFOIL, or *Potentilla*, L. a genus of plants, comprising thirty-five species, of which only eight are indigenous; the principal of these are: 1. The *fruticosa*, or shrubby cinquefoil, which is set with fine silvery hairs, has reddish stems, and yellow blossoms, that appear in the month of June: their flowers are conspicuous for their number and beauty.

This plant has been usefully employed on the Continent, in tanning calf-skins; and it is also eaten by cows, horses, goats, and sheep; but is refused by hogs.

2. The *anserina*, or wild tansey, or goose-grass. See SILVER-WEED.

3. The *argentea*, or hoary cinquefoil, which grows in meadows and pastures, in a gravelly soil, and flowers in June....The whole may be used for tanning, and dyeing black colours; as it is not touched by cattle....BECHSTEIN.

4. The *reptans*, or common creeping cinquefoil, which grows in a moist, clayey soil of meadows, pastures, and by road-sides. It is perennial, and flowers from June

to August....A fine grained calf-leather has, likewise, been prepared from this plant, on the Continent....The red cortical part of the root is mildly astringent, and antiseptic: a decoction of it has been found an excellent gargle for loose teeth, and spongy gums.

Cinquefoil, the Marsh. See Purple Marshlocks.

Circulation. See Transfusion.

CISTERNS are vessels employed for the reception of rain, or other water, either under ground, such as those of navigable canals, &c. or above ground, for domestic and other purposes. In this place we shall treat only of the latter.

As the water collected in leaden cisterns is apt to corrupt, either by stagnating for several days, when the pipes happen to be obstructed, or by the deposition of feculent matter, as well as the incrustation formed in such vessels, it follows that they ought to be frequently cleansed of the copious sediment they contain. This attention is the more necessary, as *lead* is a metal liable to be dissolved by acids; and, in that state, proves a slow, but fatal poison. Although the acidity contained in stagnant water, which has, in its course, been impregnated with animal and vegetable particles, cannot be very considerable, yet it will be more safe, and prudent, to prevent the formation of such acids, by an early attention to the purity of the water. See Filtration. [For an excellent cement to line water cisterns, see Cement.

The deeper cisterns are, the better the water will be kept. Where the ground is not so bad as to require a round form, a cube is a good figure: a double cube must be better, as it gains depth and consequently coolness. A cistern of 6 cubic feet, holds 16 hogsheads of 100 gallons each, or 26 hogsheads. A double cube of 5 feet would hold above 18 rum hogsheads of 100 gallons. The pit should be dug exactly by square and plumb. On the face of the pit, lay potters-clay. plasterwise, with a trowel, coat over coat (as it dries and cracks) two or three inches in all. Against this firm even face of plaister raise the brick or stone work. Bed the bottom, three or four inches thick with strong clay, beat to a smooth, even surface. Moisten the clay, and beat it with switches, or small hoop poles, but with nothing heavy. On this clay-floor, lay a double bed of brick; and, on the margin of this, carry up the side walls half brick thick, laying them in terras. Cover the cistern over, but leave room to fix a small pump, which must be two feet from the bottom: or a roller and bucket may be used to raise the water.

The above directions are taken from Mr. Bordley's Essays, and will answer where lime cannot be had to make Mr. Hunn's cement, before noted. In many places of Europe, rain-water saved in cisterns is the only water drank. Stolberg says, he drank some in the vicinity of Naples, near three years old, and found it excellent. Mr. Bentham has lately taught us, that water may be kept during the above period perfectly sweet. On the flat coasts of the United States, these rain water cisterns ought to be generally built: for the water from the ground is very bad, and occasions many of the disorders attributed to other causes.]

CITRON, or *Citrus*, L. an exotic genus of plants, comprising six species; of which the following are occasionally reared in hot-houses.

1. The *Medica*, or Citron-tree, which is a beautiful evergreen, rises from five to ten feet in height, and forms a full head, thickly set with leaves. It is very luxuriant in its vegetation, shooting forth a profusion of sweet flowers in the spring, and early in the summer, which are frequently succeeded by an abundance of fruit, that arrives, sometimes, at tolerable perfection.

This species is originally obtained by seed; but the most certain method of propagating it, is by *budding* it on stocks raised from seeds to a proper size. These may be sown, in March, in pots of rich light earth, half an inch deep, and plunged in a hot-bed under frames and glasses, being occasionally watered. Towards the middle of June, they may be exposed to the open air, in which they should remain till October, when they are to be removed to the green-house till the ensuing spring. In the month of March, or April, following, they will be fit to be transplanted, singly, in small pots, care being taken to water them immediately after that operation is performed, and to repeat it when necessary; so that, in the course of a year, or two, the largest of those designed for stocks will be fit for budding. Previously to their being planted, they must be set for a day or two in tubs of water, to *plump* their bark and roots. Next, they should be washed and cleaned, the roots freed from diseased parts and all the small dried fibres. They are then to be planted in pots filled with light earth, and plunged in a tan-bed, where they should remain for three or four months; after which they may be exposed to the open air, but will bear it only from the end of May to the middle of October.

The fruit of the citron-tree yields a very agreeable acid, which is of considerable utility in medicine, particularly as an antiscorbutic..... See LEMON-JUICE.

There is another variety of this species, growing abundantly in the British West India Islands, producing a spherical fruit of a much smaller size than the lemon, and containing an acid juice, in a more concentrated state.....See LIMES.

2. The *Aurantium*. See ORANGE.

3. The *Decumana*, or the Giant Citron, which is common in the East and West Indies, and produces a fruit, sometimes 14lb. in weight, containing a sweet pulp, and small compartments in the centre, which abound with a sub-acid vinous juice. As it requires nearly two years to arrive at maturity, in the climate of Europe, it is seldom cultivated.

CLARIFICATION, is the act of clearing or fining liquids from heterogeneous or feculent ingredients. For this purpose, the whites of eggs, blood, and isinglass, are usually employed: the two first, for clarifying liquors, while boiling hot; the last, for those which are to be fined when cold; as wine, ale, &c. The whites of eggs are beaten up into a froth, mixed with the liquor, and united with the impure particles floating on it; which soon indurate, and are carried up to the surface, in the form of an insoluble scum. Blood operates in a similar manner, and is principally used in the processes of refining salt and sugar.

Great quantities of isinglass are consumed in fining turbid wines. A solid piece, about a quarter of an ounce in weight, is put into a cask of wine, where it gradually dissolves, and forms a skin upon the surface: this pellicle at length subsides, carrying down with it the feculent matter that floated on the wine. Other vintners previously dissolve the isinglass; and, having boiled it down to a gelatinous consistence, mix it with the liquor, strongly agitate the cask, and then let it stand to settle. It deserves, however, to be remarked, that wines treated in this manner are tainted with a very putrescent animal substance, and cannot be wholesome. [See WINE, CYDER, BEER.]

[*The following observations are abridged from a long paper by* PARMENTIER, *in "Annales de Chimie."*

The most simple method of clarifying liquids is, by repose: but this method is tedious, and tends to the formation of new products, which by changing the composition of the fluid itself, no longer presents it, independent of the abstraction of the bodies which affected its clearness, the same as it was before its clarification. Thus, the juice of lemons, gooseberries, &c. when examined before or after their spontaneous clarification, are so different in their taste, colour, and their domestic utility.

The effects here stated take place only with respect to such liquids as are fermentable. Other fluids, as water, alkohol, æther, oil, &c. are well adapted to this treatment.

The second proof of clarification is by *filtration*. The instruments of this process are various. For water, viscous, alkoholic, or oily fluids; paper may be used: and such must be chosen as has its pores of a requisite magnitude to admit the fluid intended to be filtered, without suffering any of the particles which produced the turbidness to pass through. For syrups, woollen cloths are used; the operator fixes his cloth in a square frame, fastening the four corners upon pins disposed for that purpose. The boiling syrup is poured in the middle, where it always forms a kind of concavity, and the liquid passes very clear.

Essential oils are filtered by introducing carded cotton into the tube of a glass funnel, where it is lightly pressed together with a glass rod, so as to form a kind of stopper: after which the fluid to be filtered is poured into the funnel.

Concentrated acids, can only be filtered through pounded glass, which must be washed several times before using; first in a larger quantity of water, and afterwards in an acid, in order to deprive it of the earthy substance which the acids might dissolve. Sand is also commonly employed to clarify water for domestic uses: it must, however, be changed frequently.

Filtering stones are bad instruments to procure good water; for the filtration is made slowly, and very often stops altogether, if the inner and exterior surfaces of the stone be not rubbed from time to time with a coarse brush, to detach the earth which the water deposits.

The whites of eggs, the acids, certain salts, lime, blood, and alkohol, may, in many cases, concur to operate the clarification of certain fluids. Experience determines the preference given to one rather than another.

Most syrups are clarified by heating them, after having mixed

the whites of eggs with them; the clarification is effected at the instant the mixture begins to boil.... It has also been observed that the white of eggs alone is not sufficient to clarify liquids, even though they be heated sufficient to cause them to boil, but that it is necessary to assist its action by means of an acid, or salt with excess of acid.... In proof of this, the clarification of whey, may be offered as an example. Whey, in which the white of eggs have been mixed, does not admit of the coagulation which carries the cheesy matter along with it, unless a portion of acidulous tartarite of potash or vinegar be added at the instant the boiling begins.

Most of the juices of plants newly expressed, may be partly clarified by heat. This method may be recurred to, when the viscidity and density of the juices, prevent a filtration.

It is highly important to observe, that in general, it is necessary to separate the magma which is formed in liquors clarified by the white of eggs, particularly when, in order to concentrate these fluids, it is necessary to evaporate them by boiling. Without this precaution, we shall see the same magma dissolve, and the fluids become more turbid than they were before the clarification. For a like reason, it is that soups, which have not been skimmed in time, always retain a cloudy and unpleasant appearance.

Though the whites of eggs are of considerable use in clarifying the juices of certain plants; yet the nature of these fluids is sometimes changed so much, that their medical properties are partly destroyed. LEWIS has observed, that by clarifying the syrup of diacodium with the whites of eggs, the medicine is deprived of its medical properties. See articles CYDER, COFFEE, VINEGAR, WINE, BEER.]

CLARY, or *Salvia*, L. is a genus of native plants, producing two species:

1. The *Pratensis*, or Meadow-Clary, which grows in dry pastures, and is found principally in the counties of Surrey and Sussex. It is perennial; flowers in the months of June and July; and its leaves are slightly aromatic. When soaked in water for a few minutes, its seeds acquire a mucilaginous coat, somewhat similar to the spawn of frogs. BECHSTEIN observes, that this plant, when used as a substitute for hops, imparts an agreeable flavour to beer and wine; but, at the same time, renders them more intoxicating, and pernicious to health. It may, however, be more usefully employed in tanning leather, and dyeing a permanent dark brown.

2. The *Verbenaca*, or Wild English Clary, which is also perennial, grows in gravelly, calcareous soils, and blows from June to October. This species is smaller than the preceding, but more aromatic. Its seeds, when immersed in water, possess the property of the pratensis in a superior degree.

Both the leaves and seeds of this plant, have a warm, bitterish, pungent taste, and a strong, though not agreeable, odour. They are principally recommended in hysteric disorders, and in flatulent colics.

CLARY-WATER is composed of brandy, sugar, clary-flowers, and cinnamon, in which a little ambergris is dissolved. It is also prepared with brandy, juice of cherries, straw-berries, and goose-berries, cloves, white pepper, and coriander-seeds; the whole of which are

infused, sweetened, and strained. This medicated water is said to assist digestion, and to be "an excellent cardiac;" but we have reason to apprehend that it is, like all other *cordials*, calculated to increase the catalogue of tipplers, rather than to promote the purposes of health.

CLAY is a compact, heavy, stiff, viscid, and ductile earth, when moist, which is easily dissolved, and, when mixed with water, does not readily subside.

For promoting the vegetation of many plants, clay is a necessary ingredient in the soil, with the exception of those species called *argilla aerata*, or *lac lunae*, and *argilla apyra*, or porcelain, and other white, fermenting clays, for which no use has hitherto been discovered in agriculture. By its cohesion, clay retains humidity, on which, perhaps, its fertilizing property chiefly depends.

In its pure state, clay is unfit for the purposes of vegetation, on account of the great adhesion of argillaceous particles, which cannot be penetrated by the tender fibres or roots; but, when mixed with calcareous earth, and siliceous sand, or marl, it is much improved, and of great use in tillage.

It is commonly believed, that lumps of clay, in a moist state, may be rendered more friable, by exposing them to frost; which, by expanding the water they contain, and converting it into ice, is supposed to cause a farther separation of the clayey particles. This notion, however, appears to be erroneous; for, unless the frost be very sudden, it will probably be attended with a contrary effect. Mr. KIRWAN observes, that clay, in its dry state, absorbs more than twice its weight of water, before it parts with that fluid, and retains it, in the open air, more tenaciously than other earths; but in a freezing cold, clay contracts more than other soils, and, as it were, squeezes out its water in a greater than usual proportion.

As clay, by the great cohesion of its particles, is not well adapted to the growth of roots, Dr. DARWIN remarks, that it may, in some degree, be corrected, by frequently exposing the air confined in its interstices; for instance, by turning it over with the plough, or spade. Another method is, by planting, in a clayey soil, first, those vegetables which are known to thrive in it, such as beans; and if their roots be afterwards left to putrify in the clay they render the mass less cohesive, and enrich, rather than impoverish, the land. When clay abounds with vitriolic acid, so as to be convertible into alum, it becomes very unfavourable to vegetation, and checks the growth of trees, as well as of herbaceous plants, by corroding the fine extremities of their roots. This injurious quality may be most effectually remedied, in gardens, by wood-ashes, or soap-suds; and, in fields, by mixing with such clay, lime, powdered chalk, or the sweepings of roads consisting of limestone.

CLAY LANDS, are those which abound with clay, whether black, blue, white, &c. of which, the black and yellow are the best for corn.

All clay soils, as they retain too much water, are apt to chill the plants in moist seasons; on the contrary, in dry weather, they become hard, and obstruct vegetation. They naturally produce weeds, goose-grass, thistles, poppies, &c. but

some will yield clover and rye-grass; and, if well manured, bear the best grain. Such soils are more advantageously manured than any other lands: the most proper that can be selected for this purpose, is horse or pigeons' dung, malt-dust, chalk, &c.

Clay-ground is naturally steril, because it adheres together in masses. This defect may, however, be remedied, by mixing with it burnt clay; which tends to correct the cold nature of the soil, and will, by proper tillage, yield most excellent crops.

A remarkable instance of rural industry, in rendering a wet clayey soil uncommonly productive, occurs in the 28th volume of the *Annals of Agriculture*. The land was two perches in width, and gently arched up, so that the crown of the ridge was about 2, or $2\frac{1}{2}$ feet higher than the bottom of the furrow. These ridges were gently rounded off, so as to describe the form of a segment of a very large circle, then disposed into double beds, and well manured. The fertility of the soil was farther promoted, by adapting the course of crops to its nature; namely, by sowing, 1st. beans; 2d. wheat; and, 3d. clover. In this succession, the beans were set upon a *clover-lay*, which saved much time, in preparing the land after the common way; and being sown just before, or immediately after, Christmas, they were ready to be hoed in the dry weather, usually occurring [in England], towards the end of February, or the beginning of March: by this management, they were brought so forward, that they could be cut in July or August. It is an error in agriculture, that beans cannot be left too long on the ground. They should be harvested while most of the pods are quite green; by which means a fine sample is secured, and the straw rendered incomparably better. After the beans, wheat was sown; and over that, in the month of March, or April, from 15 to 20lbs. of clover seed per acre, which, in the following year, was mown twice for hay. These crops are particularly valuable on strong soils, where oats and barley never thrive well; and even if a large crop of either should be raised, it would be of a very inferior quality. Hence we recommend a similar course to be pursued, as the labour and expence necessarily incurred, will be amply compensated by perseverance and industry.

[Clayey lands are apt to be very barren in their natural state, unless when a summer is so divided betwixt rain and sunshine, that they are kept on a medium continually betwixt drought and wetness, which seldom or never happens. In a wet season, plants growing on such a soil are drowned, as the closeness of the clay will not suffer the water to soak into the ground: and, in a dry season, the ground becomes so solid that the roots of plants cannot penetrate it.

This kind of earth, however, is thought to contain more of the food of plants than almost any other. But something needs to be done to bring it into action. The European farmers think their clay soils the richest, and most valuable of their land. But many of our farmers despise them, for want of knowing what methods to take to render them profitable; or through fear of the labour or expence of doing it.

Some of these soils, without

much alteration, will bear good crops of grass, if care only be taken not to feed them close, nor to let cattle in upon them in the spring. But the farmer who wishes to keep them in tillage, must alter them by the admixture of such substances as may serve to open the soil, and break the cohesion of its particles. When this is once accomplished, the land will become highly valuable; holding the manure to admiration, and never returning to its pristine state.

Dung is helpful towards opening a clayey soil, by the fermentation it raises, as well as by the mixture of its earthy saline and oily particles. But dung of itself will not be sufficient, unless it were laid on more plentifully than farmers can well afford. A mixture of dung and sand is found to be a much better dressing for this sort of land, than dung alone. And if sand be not too far distant, it would be advisable to put on a layer of it two or three inches thick. Beach-sand is preferable to any other, as the saltness of it will help to make the ground fruitful. But pit-sand will do very well.

In places where sand is not to be had, the ground may be loosened with other substances. Gravel, or light loam from the neighbouring spots may be carted upon it; dust from saw-pits, chips and rubbish from the back yards of houses, straw and stubble, swamp mud, the bark of trees and rotten wood, or burnt-clay. I have known a clayey spot made very fruitful merely by the remains of a rotten log-fence, when mixed with the soil.

When a clay soil is sanded, or any other thing laid on to open it, it will take several ploughings and harrowings to mix it, so as to bring the land to a good consistence. As the expense of mixing it at once would be too great, it is better to use it for two or three years after, for the growing of such tillage-crops, as are most suitable to a clayey soil, such as barley, flax, &c. The soil will grow better, year after year, till the sand, &c. is thoroughly mixed with the soil; after which it will be fruitful forever without large dressings. Hoed crops will mix it sooner than any other method, and without any expense.

A small quantity of dung, each year that it bears a hoed, or a green crop, will be proper: And the most suitable dungs, are those of horses and sheep, pigeons and other fowls, which by their heat will correct the natural coldness of the soil....Folding with sheep has an excellent effect on this kind of land.

Such a stiff soil is also mended by frequent ploughings. The Europeans allow three ploughings previously to feeding, to be enough for a free soil; but to a clayey soil they give four or five. The oftener it is stirred with the plough, the more the cohesion of the particles is broken, and the more easily the roots of plants can penetrate it in search for their food. But it never should be ploughed when it is so wet as to potch with the feet of the cattle, or to run like mortar. In this condition the more it is worked the stiffer it will become. On the other hand, when it is very dry, it cannot well be ploughed, by reason of its hardness. Suitable seasons should be embraced, for ploughing it, when it is neither too wet nor too dry. At the first ploughing it comes up in large clods; but the oftener it is

ploughed in fit times, the smaller the clods will be, and the more fine mould will be among them.

Exposing the clods to the sun and air has some tendency to mellow the soil: But a winter-furrow is of very great advantage. The frost does much towards breaking the cohesion, as I have found by experience.

Clay soils, after all the amelioration that can be given them, will be more suitable for some plants than for others. Those plants in general which require a great degree of heat, or a long summer, are not so well adapted to be cultivated in a clayey soil, such as Indian corn, tobacco, &c. But it may be made to produce good crops of wheat, grass, barley, oats, flax, &c.

Fruit trees in general, and I think all sorts, excepting pear-trees, answer but poorly in a clayey soil, how much soever the surface may have been mixt with other substances. The roots of trees will need to draw some of their nourishment from a part of the soil below that which has been meliorated by mixing; but the compactness of it will scarcely suffer them to penetrate it.

Fallowing and green-dressing may help to pulverize a clayey soil; and sowing it frequently with pease is recommended. Any crop that forms a close cover for the surface, causes the soil to rot, breaks the cohesion of its particles, and prevents the ground from hardening by the influence of the sun. A clay soil on which water stands must be water furrowed, and ploughed in ridges. Sometimes drains will be necessary. N. *Eng. Farmer.*]

The United States abound with a variety of excellent clays, proper for even fine wares. In North Carolina a large body is said to have been found before the revolutionary war, some of which was taken to England and highly approved of by Mr. Wedgwood. Will any gentleman forward a specimen to us of the clay alluded to?

In that part of the South Mountain, where the Cotoctin Mountain separates from it, in Washington county, Maryland, in Conocogeague settlement, an argillaceous earth has been found, which bears all the characters of the Argilla Porcelaina of Linnæus. It lies in immense bodies along the strata of iron ore, and is called Mine-clay by the miners.

Before the late revolutionary war, a china manufactory was established in Philadelphia, and some excellent specimens made at it, are still to be found. The clay was brought from white clay creek, Delaware, as we have been informed.]

CLEAVERS, or Clivers. See Goose-Grass.

[Clematis, *Crispa.* Curled Virgin's Bower. This plant has weak stalks, which rise near four feet high, and by their claspers fasten themselves to their neighbouring plants. The corolla is purple, inside curled; flowers in June. There are other species, natives of the United States. The *Clematis recta*, or upright Virgin's Bower, is highly praised by Baron Stoerck in inveterate syphilitic cases, in ulcers, and severe head aches. It acts as a diuretic and diaphoretic. He used an extract of the leaves, but he chiefly recommends an infusion of the fresh leaves, two

or three drams to a pint of boiling water, four ounces to be taken three times a day, whilst the powdered leaves are applied to the ulcers. Most of the species are acrid, and corrosive, and may be used for raising blisters, where cantharides, or the American blistering fly cannot be had. The latter insect is very fond of the *Clematis crispa*, and it would be well for medical gentlemen in the country to propagate the plant about their residence, in order to secure a constant supply of those valuable insects.]

CLIFF-KALE, or Sea-Kale. See SEA-COLEWORT.

CLERGY, BENEFIT OF, is an ancient privilege, by which a person in holy orders may claim to be delivered to his ordinary, to purge himself of felony. It was formerly confined exclusively to the clergy, but has been extended, since the Reformation, to the laity. Accordingly, by the 1 EDW. VI. c. 12, all Lords of Parliament, and Peers of the Realm, shall be discharged, in all clergyable and other felonies, provided for by the act, without being burnt in the hand, or transported....or at most being imprisoned only for one year....in the same manner as real clerks convict are. By the same act, all the commons, not in orders, whether male or female, shall, for the first offence, be discharged of the punishment of felonies, within the benefit of clergy, on being burnt in the hand, and suffering a discretionary imprisonment; or, in case of larceny, on being transported for seven years, if the court shall think proper.

CLIMATE, is a term usually given to any country or region, that differs from another, as well with respect to the seasons and quality of the soil, as to the manners of its inhabitants.

The climate of [England], though in general temperate, is extremely variable. The transitions from heat to cold, however sudden in Britain, are less severely felt than upon the Continent. Yet these frequent changes are productive of many diseases.

This island is peculiarly subject to showers, and to close, cloudy, foggy weather; which must be ascribed to its insular situation. Clouds are continually wafted over from the sea, by every wind, and condensed by the cold land-air, as also by the humid vapours arising from plants, and thus precipitated in rain. From this circumstance, an uninterrupted continuance of dry weather is seldom experienced in Great Britain. But, though such frequent changes, together with the moist and cold air so generally prevalent, render the inhabitants of this country liable to many disorders, yet the more malignant epidemics are less fatal, and occur less frequently, than in most continental regions; because we enjoy the benefit of pure and temperate sea-winds, and are exempt from the two extremes of heat and cold. The moisture of the British air, indeed, tends to relax the fibres; but it also promotes accretion, while its cool temperature condenses the solids, and invigorates the whole body. Hence it happens, that the natives of Great Britain are, in general, stouter, and more robust than those of other countries; and, though many persons here are subject to scorbutic and rheumatic complaints, arising from these various causes, to which must be added their gross and solid, or luxurious food, yet a far greater propor-

tion of the inhabitants of this island lives to an advanced age, than of those of any continental country. This assertion, however, chiefly relates to salubrious farms and villages, where the people are more temperate, and less debauched by spirituous liquors, than in towns. We may farther remark, that the prevailing custom of wearing light and thin dresses, especially among females, is by no means conducive to longevity; for, as those votaries of fashion and caprice, are in all seasons, exposed to colds and rheumatic complaints, many of them at length contract pulmonary, or consumptive diseases, and fall victims of folly, at a period of life when they ought to be most useful to society.

The solid, nutritive food of the inhabitants, in general, is likewise a principle cause of many diseases originating from repletion; yet it must at the same time be admitted, that such substantial nutriment greatly contributes to their strength, their full, athletic size, and florid complexion.....Those of our readers, who wish to acquire additional information on this subject, we refer to Dr. W. FALCONER's elaborate "*Remarks on the influence of Climate, Situation, Nature of Country, Population, Nature of Food, Way of Life: on the Dispositions and Temper, Manners, and Behaviour, Intellects, Laws, and Customs, Forms of Government, and Religion of Mankind*" (4to. 18s. Dilly....Mawman, 1781), in which this interesting topic is minutely and ingeniously discussed.

[In a work chiefly of a *domestic* nature, a philosophical digression into the various causes which influence the climate of countries in general, and of the United States in particular cannot be expected. It may however be useful to state a few facts on the subject, from Mr. KIRWAN's admirable treatise entitled "An Estimate of the temperature of different latitudes."

1. Elevation diminishes the mean temperature of places. If this elevation be moderate, or at the rate of six feet per mile from the nearest sea, then for every 200 feet, of elevation, allow $\frac{1}{4}$ of a degree for the diminution of the mean annual temperature.

2. Next to elevation, distance from the standard ocean seems to have the most considerable effect upon the mean annual temperature. Mr. K. attributes the effect of distance from the standard ocean, to the unequal capacities of land and water for heat; but Mr. DALTON, of Manchester, observes, that this alone appears inadequate to the effect, and he concludes, after some ingenious reasoning, that *in the temperate zones, the western coasts of all continents and large islands, will have a higher mean temperature than the eastern coasts under the same parallel; and, particularly, will have more moderate winters.*

3. All countries lying to the windward of high mountains, and extensive forests, are warmer than those lying to the leeward, in the same latitude.

Countries that lie southward of any sea, are warmer than those that have that sea to the south of them. Islands participate most of the temperature of the sea, and are therefore not subject to the extremes of heat and cold so much as continents.

The temperatures of different years, differ very little near the equator, but they differ more and more as the latitudes approach the poles.

The climate of Pennsylvania,

east of the Alleghany mountains, has unquestionably become much milder in the course of the last forty years. To account for this fact is perhaps a difficult task.

On this subject the reader is referred to Dr. WILLIAMSON'S interesting paper in the first volume of the American Philosophical Transactions: and to Dr. RUSH'S account of the climate of Pennsylvania; and for an ingenious discussion of the causes of the remarkable difference which exists between the temperatures of the United States of America, and the corresponding parallels of latitude in Europe," Doct. BARNWELL'S "Physical Investigations" may be consulted. In the fourth volume of the American Philosophical Transactions may also be found some interesting observations on the climate of the western parts of Pennsylvania, particuly those in the neighbourhood of Lake Erie, by Mr. A. ELLICOTT.]

CLOCK. See TIME-PIECE.

CLOSE-STOOL, a chamber implement of considerable utility to patients and invalids; though it has lately been in a great measure superseded by the invention of *water-closets*. These, however, being attended with such expence as to preclude many families from their acquisition, it may be useful to mention an easy method of suppressing the fetid exhalation arising from vessels of the former description, when kept in sick-rooms, especially during the night. A foreign writer suggests the following expedient: Take a handful (we suppose, three or four ounces) of green vitriol; dissolve it in half a gallon of boiling water; and, when cold, pour a quart of it on the feces immediately after each stool. In this simple manner, we are informed, the most unpleasant stench will be effectually neutralized; a circumstance of great importance in putrid and malignant fevers.

CLOT-BURR. See BURDOCK.

CLOTH, in commerce, a manufacture made of wool, cotton, flax, hemp, &c. woven in a loom. In this place, however, we shall treat only of woollen cloths: these are of various qualities, fine or coarse, which depend on a variety of circumstances.

The best wools for manufacturing cloth are those of England and Spain, especially of Lincolnshire and Segovia. In order to use them to the best advantage, they should be previously scoured, in a hot liquor consisting of three parts of pure water, and one of urine. When it has soaked a sufficient time in this liquor, to dissolve the grease, it is drained, and properly washed in running water: as soon as it feels somewhat rough, and is divested of all smell, except the natural one of the sheep, it is said to be properly *scoured*. The wool is next exposed to dry completely in the shade; after which it is beaten with rods upon wooden hurdles, or on cords, to cleanse it from the dust and grosser filth, and prepare it for spinning, when it must be well picked, in order to separate the remaining impurities.

After this process, it is oiled with oil of olives, and given to the spinners, who first card it on the knee with small fine cards, and then spin it on a wheel; care being taken to make the thread of the warp one third less than that of the woof, and to twist the former more compactly. The thread is then reeled, and formed into skeins: that designed for the warp is wound on small tubes, pieces of paper, or

rushes, so disposed that they may be easily put in the eye of the shuttle; that intended for the warp is wound on large wooden bobbins. As soon as it is warped, stiffened with size, and dried, it is mounted on the loom. The weavers, of whom there are two to each loom, tread alternately, on the right, and on the left step of the treddle, which raises and lowers the threads of the warp equally; between which latter they throw the shuttle transversely, the one to the other...... Every time the shuttle is thrown, and a thread of the woof inserted in the warp, they strike it jointly with the same frame: to this is attached the comb, or reed, through the teeth of which the threads of the warp have been previously passed; the blow being repeated as often as is necessary. Having filled the whole warp with the woof, the cloth is unrolled from the beam on which it had been wound while weaving, and given to be cleansed from the knots, ends of thread, &c. an operation which is usually performed with iron nippers.

In this state it is carried to the fullery, and scowered with urine, or with a species of potters' clay steeped in water. As soon as the cloth is again cleared from the earth or urine, it is returned to the former hands, for taking off, as before, the smaller straws, &c. when it is delivered to the fuller, to be beaten and fulled with hot water, in which a proper quantity of soap has been dissolved. After this second fulling, it is smoothed, or pulled lengthways by the lists, in order to take out all wrinkles and unevenness. This operation is continued till the cloth is brought to a proper breadth, when it is washed in clear water, to cleanse it from the soap, and afterwards given wet to the carders, to raise the hair, or nap, with the teasel (*Dipsacus fullonum*, L.) The cloth-worker then takes it in hand, and performs what is called, the *first shearing*, after which it is again delivered to the carders, who pass it repeatedly under the teasel, in proportion to the quality of the stuff. It is next returned to the cloth-worker, and from him to the carders, where the same operation is continued till the nap on the surface be properly ranged.

Thus prepared, the cloth is sent to the dyer, who, after having given it the proper colour, immerses it in pure water, and delivers it, while wet, to the worker. The latter lays the nap with a brush on the table; and then suspends it on tenters, where it is sufficiently stretched, and brushed while wet, it order to bring it to its proper dimensions. As soon as it is completely dried, it is again brushed on the table, to finish the laying of the nap; after which it is folded, and laid cold under a press, to make it smooth, and to give it a gloss. When it is taken out of the press, and the papers for glossing it are removed, the cloth is fit for immediate sale, or use.

With respect to the manufacture of mixed cloths, or those in which the wools are dyed previously to their being wrought, the process varies but little from that just described, except in what relates to the colour.

Cloth, in general, constitutes one of the most necessary articles of domestic convenience: hence many ingenious persons have attempted to discover substitutes for Flax and Hemp, of which we shall give a short account, in their alphabetical order.

Woollen cloths being liable to be stained, or soiled, by a variety of accidents, different methods have been contrived to remove such spots, and thus restore the cloth to its former beauty. When stained with grease, fullers' earth, pure pot-ash, or other absorbents, will produce the desired effect. Spots of ink, or other stains, may be taken out by the acid of sorrel, or the oxalic acid (essential salt of lemons), and the colour restored by alkalies, or by a solution of tin. It frequently happens, however, that spots are owing to different unknown causes, which render it necessary to recur to compositions possessing various powers. For this purpose, CHAPTAL recommends white soap to be dissolved in alkohol: in this solution are to be mixed the yolks of four or five eggs, to which should be gradually added, some spirit of turpentine and fullers' earth, in such proportions as to give the whole mixture, when stirred, a due consistence for being formed into balls. The spots, after being wetted, are to be rubbed with these balls; when the cloth also should be well washed, and cleansed. Thus, every kind of spots (those of ink, or other solutions of iron excepted) may be effectually removed.

In February, 1796, a patent was granted to Mr. JOHN GRIMSHAW, of Strines-hall, Derbyshire, calico-printer, for his invention of certain substances to be used in clearing, or bleaching, printed, stained, or dyed woollen, and other cloths..... The principal ingredient employed by the patentee appears to be, the common grains which remain after brewing, and which are put into a close vessel, in order to become sour. This is usually effected in six days in hot, and in about eight days, in cold weather. As soon as the grains have acquired the necessary degree of acidity, three or four bushels of them are directed to be put into a common-sized calico-printer's copper pan, nearly full of water. Into this mixture the stained cloths are repeatedly immersed, and turned over a winch or reel placed across the pan. The operation is continued from five to fifteen minutes, during which the mixture is directed to boil gently; the pieces are then taken out, and washed immediately, either in hot or cold water, and treated in the same manner as goods that are cleared with bran. When twelve or sixteen pieces have been thus cleaned, an additional bushel of sour grains is to be added, and the pan filled up with water: when it boils, the operation may be repeated with other cloths, as before. See BLEACHING.

CLOTHES. See MOTHS.

CLOTWEED. See BURDOCK the Lesser.

CLOUD-BERRY, or MOUNTAIN BRAMBLE, the *Rubus chamæmorus*, L. an indigenous species of the raspberry-bush, which grows in peat-bogs, and on the sides of mountains.

This plant seldom exceeds one foot in height, produces white blossoms in the month of May or June, and afterwards red berries. These are not unpleasant to the taste, and are frequently brought to the table with the desert, in the Highlands of Scotland, as well as in the more northern parts of Europe, where they are reputed to be an excellent antiscorbutic.

CLOVE, a term used in weigh-

ing wool, consisting of 7lbs. In Essex, 8lbs. of cheese or butter make a *clove*.

CLOVE-PINK, or CARNATION, the *Dianthus caryophyllus*, L. belongs to a genus of plants comprising twenty-eight species; of which six only are natives of England. The carnation in its wild state, grows on old walls, and is found among the ruins of ancient castles. It usually flowers in the month of June or July.

Although clove-pinks will thrive in almost any garden soil, yet they delight most in those of a light loamy nature. They are propagated chiefly by seed, in March or April, and generally come up in a month after sowing. When properly weeded and watered till July, they will be fit for transplanting into nursery-beds, which should be about three feet wide, and in an open situation. In these beds, the plants are to be *pricked* during moist weather, at the distance of four inches from each other, and moderately watered; which should be occasionally repeated, till they have taken good root. In September, they will be fit to be finally transplanted into other beds of good earth, about three feet wide, in rows nine inches asunder. Here they are to remain till spring; but if the winter prove very severe, they should be sheltered with mats. In the vernal season, they ought to be carefully weeded with a hoe, and the flower-stalks must be tied up to sticks, in order to prevent their drooping, by which their growth would be retarded.

Clove-pinks have a pleasant aromatic odour, and are said to be cardiac and alexipharmic. A decoction of these flowers has been successfully used in malignant fevers; and, as PAULLI asserts, they raise the animal spirits, quench thirst, and powerfully promote both perspiration and the secretion of urine, without occasioning great irritation.

CLOVER, a species of trefoil, or *Trifolium*, L. a genus of plants comprising 55 species, of which only 16 are indigenous in England: of these the following are the principal.

1. The *pratense*, or common [red] clover, which is frequently found in meadows and pastures. This species thrives best on a firm heavy soil, and is raised from seed, which is usually sown between the months of February and [April,] in the proportion of ten or fifteen pounds per acre. If it be often sown on the same land, the crop will fail; it should therefore be changed for trefoil or lucerne.

Common [red] clover is usually sown together with wheat, in the spring, as well as with barley and oats; but experienced farmers generally prefer wheat; as, in dry seasons, the clover frequently overpowers the oats or barley; and, if it be sown late, in order to obviate this evil, it often fails, and the crop is lost for that season. It is also mixed with rye-grass; and, if mown when the latter is beginning to flower, the lower growth is considerably increased, and a great quantity of excellent grass is obtained. Another advantage arises from this expedient; for, however severe the frost may be, the clover will be completely screened from its piercing effects by the rye-grass.

The common clover is in flower from May to September, and produces seeds which are known to be ripe by the stalks and heads changing their colour. Cattle, sheep, and

pigs are exceedingly fond of this species, and frequently eat of it so eagerly as to become *hoven* or *blown*. That disorder, however, may be prevented by constantly moving them about the field, when turned in, so that the first ball may sink into their maw before the next be deposited. Or, if cattle be turned into clover belly-deep, they will, it is said, receive no injury by eating too freely of it; as it is pernicious only in its earlier state..... Should they, nevertheless, be attacked with that dangerous swelling, they may be relieved by adopting the remedies pointed out under the article CATTLE, vol. i.

It deserves to be noticed, that the introduction of this beneficial plant into modern husbandry, has been attended with numerous and important advantages. Since that period, the new system of stall-feeding dates its origin. Many insignificant farms, on the Continent of Europe, have since been converted into valuable estates; for, as this species of clover is annually productive of three or four crops, for two years at least, it is generally ploughed in, after the last mowing, in autumn, and wheat or rye, immediately sown on the land, without any other manure, except what is derived from the fertilizing roots of that vegetable. Sometimes, however, gypsum is scattered on such fields during winter, in [Pennsylvania, this operation is generally performed during the months of March or April.]

In Sweden, the heads are employed for dyeing wool of a green colour; and if mixed with alum, they yield a light, if with copperas, a dark green colour.

2. The *medium*, or red perennial clover, which is found in pastures, hedges, and on the sides of woods. It thrives on a rich soil, whether clay or gravel, and will even grow upon a moor, if properly cultivated. It grows spontaneously on marl-land; but is usually reared from seed, which should be put in the ground from the middle of April to the middle of May. This species, as well as the common clover, is frequently sown together with flax, on a soil highly cultivated for that purpose; and, as the latter is a forward plant, it is generally removed so early as to allow the clover time for growing. Red clover is sometimes sown by itself; but this practice is by no means to be recommended; for the crop is liable to be lost, unless it be sheltered in its infant state, during the severity of the winter, [or from a hot sun.]

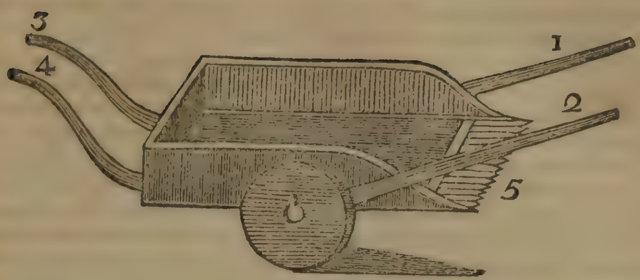
When red clover is intended for seed, the ground ought to be carefully cleared of weeds, that the seed may be preserved pure. It is collected both from the first and second crop, but principally from the former. When one half of the field has changed its colour, by the drying of the *clover heads*, the reaping of them may then be commenced. In America, this is effected by two implements, [which are described in the trans. of N. Y. Agric. Soc. by Mr. L'Hommedieu, and were invented in Brookhaven, Suffolk County, New York,] and for ingenuity and simplicity of construction, deserve to be greatly recommended: we have therefore subjoined the following representations:

Dimensions.

1, 2, The shafts, 4 feet 4 inches long, and three feet asunder.

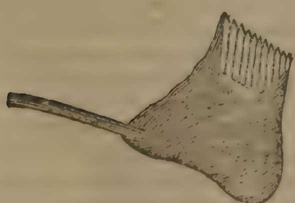
3, 4, The handles, 3 feet long, and 20 inches apart.

5, The fingers, or teeth, thirteen inches long.



The wheels are sixteen inches in diameter.

This machine is drawn by one horse, and guided by a man or boy; it simply consists of an open box, about 4 feet square at the bottom, and about three in height, on three sides; to the fore part, which is open, fingers are fixed, similar to those of a cradle, about 3 feet in length, and so near as to break off the heads from the clover-stocks between them, which are thrown back into the box as the horse advances. The box is fixed on an axle-tree, supported by two small wheels, two feet in diameter; two handles are fixed to the hinder part, by means of which the driver, while he manages the horse, raises or lowers the fingers of the machine, so as to take off all the heads of the grass; and, as often as the box is filled with them, they are thrown out, and the horse goes on as before.



This instrument is called a *cradle*, and is made of an oak board about 18 inches in length and 10 in breadth. The fore-part of it, to the length of 9 inches, is sawed into fingers; a handle is inserted behind, inclining towards them, and a cloth put round the back part of the board, which is cut somewhat circular, and raised on the handle; this collects the heads or tops of the grass, and prevents them from scattering, as they are struck off by the cradle, which may be made of different sizes; being smaller in proportion for women and children, who, by means of it, may likewise collect large quantities. Mr. L'Hommedieu says, as soon as the clover is mown, it should be immediately raked into small heaps, and exposed [about three weeks] in the field, to promote the decay of the husk, as otherwise it will be difficult to obtain the seed. These heaps should be occasionally turned, especially during wet weather. It may, however, be easily ascertained, whether the husks are sufficiently rotten, or dry, by rubbing the heads or tops between the hands: when that is effected, they should be housed, and the seed threshed out when convenient, and cleared with a wire riddle. Lastly, this species is a valuable substitute for the common clover, as it continues much longer in the land.

[Upon the subject of collecting clover seed, Mr. L'Hommedieu observes further; by sowing three or four pounds of seed to the acre, on light loamy soils, which yield eight or ten bushels of wheat or rye per acre, the clover will not be profitable to mow, but standing thin on the ground, the heads will be well filled with seed. The fields are to be kept up next year, till the seed is collected, by the machine represented above. On rich lands, no seed comes with the first crop, but the second crop being shorter and thinner, is commonly well seeded. Sometimes, indeed, considerable quantities of seed are gathered from the first crop, on land where wheat has been cut the same year, the stubble, preventing the clover from growing too thick to produce seed. If the land be rich, and it is in tended to sow the first crop, and collect seed from the second, eight lbs. are not too much for one acre.

Red clover is an essential article in the rotation of crops in Pennsylvania, and the immense riches which the whole state has acquired during the last twenty years, may, in part, justly be ascribed to this grass aided by the almost magical fertilizing power of gypsum, by which more wealth has been introduced than would have resulted from the discovery of a gold mine.

If it is intended to sow clover upon winter barley, wheat, or rye, many farmers prefer sowing the seed in March, and when the ground is covered with snow, as it can be seen whether the seed is strewed evenly. If all the seed be sown in February or March, and a dry season should follow, while the roots are young and tender, the crop of grass will be lost. Mr. L'Hommedieu therefore finds it a safer way, to sow one half the clover seed proposed for an acre, at the time the wheat is sown, and the other half on the same land, in the last of the winter, or the first of the spring.

Probably the diversity of opinions with respect to the proper time for sowing clover seed, may arise from the difference in the nature of the soils on which trials have been made. An experienced agriculturist (Edward Duffield Esq.) of Philadelphia county, assures the Editor that he repeatedly failed in obtaining a crop when he sowed his clover in the autumn or winter, and that he is uniformly successful when he sows in the spring. His soil is a tight loam.

The quantity of seed allowed to an acre is various, but it is evident, that the more seed, the more benefit will be derived from the grass, both as an ameliorater of the soil, and as a destroyer of weeds. The quantity of hay produced will also be much greater. Twenty pints to an acre, however, need not be exceeded. Mr. Bordley says, a box for sowing clover seed on flat wheat *beds* rather than *ridges*, five and an half feet wide, exclusive of the water or opening furrow, seven feet inclusive, was made of light half inch boards, for the sides, bottom, and partitions. It was seven feet long, five or six inches wide, that the seed lying thin might easily shift about and not press heavily on the outlet holes. The box was three inches deep, and divided into seven parts, each division having two holes bored through the bottom half an inch in diameter, and placed diagonally. The holes were

singed with a hot iron to smooth them. Square pieces of strong writing paper were pasted over the holes, on the inside of the box. A hole was burnt, with coarse knitting needles, through each paper. At about a third of the distance from each end of the box, were fastened strong leather straps, by which the box was held, and a little agitated in carrying it before the seedsman, in a direction crossing the beds, while the seedsman walked along the beds. By an experiment made by Mr. B. it appeared, that the growth from the box sowing, was thicker, and more equally distant than that from the broad cast, and the plants more sufficiently close. The seeds were left on the ground of the field of wheat without any means used to cover them. The seven feet lands were preferred to 5½ feet lands. The water furrows were included both in the 7 feet and the 5½ feet lands. After many experiments, beds were preferred to ridges, 1. because the soil being alike in quality on the whole of the bed, the wheat grew equally well from edge to edge; 2d. in reaping, the wheat was better saved; 3. the furrows being opened deep, the greatest rains presently glided into the furrows, and were by them conveyed into the main drains of this flat land. The beds were separated by deep water furrows, formed by a double mould board plough, dipt deep by the power of only two horses.

When clean clover seeds are sown on a clean ground and harrowed in, numbers are smothered under small lumps of earth, as well as under larger ones. This waste does not take place when seed is left on the ground, or snow.

Clover seed of a bright yellow, with a good quantity of the purple and brown coloured seed among it, (which shews the maturity of the seed) should be preferred. When thoroughly ripe, and well got in, the vegetative power will continue for three or four years. Lancaster county seed is preferred to that of any other place. The late A. C. Du Plain gave me the following account of a crop of clover which he raised at Kensington on one acre of ground.

He ploughed deep in the autumn and manured with leached or spent ashes; in the following spring he ploughed in March and sowed barley after one harrowing; he harrowed again; then sowed clover seed at the rate of 20lbs to the acre: and reversing the harrow, and filling the spaces between the teeth with brush, went over the ground. He had *forty-five* bushels of barley per acre, and a small cutting of clover the first year in September: but the succeeding summer his ground yielded *eight* tons at three cuttings. Mr. D. was a man of the highest integrity, the account may therefore be depended upon.

Great care must be taken to prevent cattle from becoming *hoven*, by feeding on green clover. This is done by permitting them to fill themselves with other pasture or food, and at first turning them into the clover field for a short time, say twenty or thirty minutes, in the middle of the day, *and turn them out the moment they shew a disposition to wander or lie down.* They must never be turned in, during wet weather. This mode of pasturing is only recommended as the most saving to those who will not *soil*, as advised under the article CATTLE.

Two kinds of red clover are sown in Pennsylvania. One is particularly distinguished by the name of Dutch clover, and grows much better, and with a thicker stalk than the other. From this peculiarity, the hay made of it, is not equal in quality to that made from the common sort, but is preferable as a preparative for wheat, if ploughed in, or after one crop; and would answer admirably for soiling. It may be well to have both kinds of clover on a farm.

Hogs thrive exceedingly upon clover, and when *soiled*, no food is more economical. A statement of the number of hogs fed by a certain quantity of clover, near Wilmington, Delaware, shall be given under the article "Hogs."

In the State of Pennsylvania, clover is not, in general, permitted to continue in the ground longer than two years. It is then ploughed in, and other grain sown. See Wheat, Rye, Oats, Rotation of Crops, Pasture, Hay.]

3. The *procumbens* or hop-clover, or hop trefoil, which grows in dry meadows and pastures. It flowers in the months of June and July. When mixed with common clover, on light land, it makes a most excellent fodder. This plant is variously called back-grass and nonsuch.

4. The *repens*, or white-clover, which abounds in meadows and pastures. It also delights in light land, where it will thrive luxuriantly, if frequently rolled. It is usually sown with red clover, rye-grass, er barley, and is in blossom from May to September. It produces the sweetest hay on dry land, especially when mixed with hop-clover and rye-grass; and possesses this advantage over the common clover, that it will admit of being irrigated. Horses, cows, and goats eat it, but sheep are not fond of it, and hogs totally refuse it.

[White clover, whether soiled or pastured, is one of the most valuable grasses for cattle. It is evidently a natural grass of the country, and uniformly appears in our meadows south of the city, when closely nibbed by sheep or cattle; and a gentleman who has travelled much through the hostile Indian country, says, he has seen fields covered with this grass. The report, therefore, as stated by Mr. Strickland, to prevail among the Indians, that this plant is not to be met with *but where white men have trodden*, must be without foundation.

The sweet blossoms of white clover powerfully attract the bees, all summer, but it is chiefly in the months of May and June, that this aliment is collected and stored in hives: and it is observed that clover honey may be easily distinguished from that of any other flowers in the hive. It is much to be regretted, tho' the flowers of the red clover yield the greatest quantity of honey, yet the honey bees profit but little by them, because the tubes or nectaries of the florets are so long, that they cannot reach to the bottom, where the honey lies; for which reason it is observed that, the red clover is but little visited by bees....they yield place to the great hermit bees, or wood-borer, and humble bees, which being furnished with strong beaks that sheath their tongues, pierce the lower parts of these tubes, and suck the honey.

White clover, when mixed with Timothy, or green grass, (*poa viridis*) makes excellent hay. See Hay.]

The great utility of clover in fattening cattle is well known: we shall, therefore, conclude this article with recommending the practice of *tippling*, generally followed in the north of England, for preserving clover in wet seasons..... This is effected by rolling up the grass, immediately after it has been mown, into bundles, or *tipples* of the size of a small barley sheaf. A band is then drawn out from one side, which is twisted and tied firmly round: the tipple being placed between the knees, the part above the band is drawn through the hands with a twist, and the longest grasses are pulled out, so as to tie in a knot, which finishes the point of the cone, and forms the tipple. The advantages of this practice are obvious to the most superficial observer, as the rain is carried off in manner similar to the thatch of a house; and the sun and wind thoroughly penetrate it, so as to prevent fermentation.

In Scotland, when clover is made into hay, it is formed into ricks, containing from 40 to 60 stone weight, within two or three days after it is cut; thus it remains for two or three weeks, till it is collected into long stacks, some of which consist of 10,000 stone..... Few instances occur of hay preserved in this manner, being damaged by heating; nor is there the least danger of its taking fire.

CLOVE-TREE, or *Caryophyllus aromaticus*, L. a native of the Molucca Islands, particularly of Amboyna, where it is chiefly cultivated. The clove-tree resembles the olive in its bark, and the laurel in its height and leaves: no grass grows under it. Adorned with numerous branches, it produces vast quantities of flowers, which are at first white, then green, and at last red and hard. When they arrive at this degree of maturity, they are, properly speaking, *cloves*: in a dry state, they assume a dark yellowish cast, and at length a deep brown.

Cloves acquire weight by imbibing water, when suspended above it, even at some distance. The Dutch, who were formerly in the sole possession of the clove-trade, are supposed to have frequently taken advantage of that property; but such nefarious practices may be easily detected, by squeezing the cloves with the hand, and expressing their moisture.

This spice possesses a very fragrant, agreeable scent, and a bitterish pungent taste, which, in a manner, burns the mouth and throat. Considered as a medicine, cloves are very hot, stimulating aromatics. When distilled, they yield a limpid essential oil, which is often, though improperly, employed for curing the tooth-ach; as, from its pungent nature, it is apt to corrode the gums and injure the adjacent teeth.

CLUB-GRASS. See CLUB-RUSH.

CLUB-MOSS, or *Lycopodium*, L. a native genus of plants, comprising six species, the principal of which are.....1. The *clavatum*, or common club-moss, which grows in dry mountainous places, heaths, and woods. It is principally found in the north of England; produces a prostrate creeping stem, from one to three yards in length; flowers from July to August, and bears seeds, which, if infused in ropy wine, will, in a few days, restore it. When thrown into a fire, these seeds emit a bright flash, and also possess the peculiar property of being almost impervious to moisture, so that if they are scattered on a bason of water, the hand may be

immersed to the bottom, without being wetted.....In the north of Europe they are pulverized, and applied externally for curing chaps in the skin and other sores. Beautiful mats, or summer carpets, are manufactured of the stalks of this plant, in Sweden.

2. The *selago*, or fir-leaved club-moss, which is very common on the mountainous heaths in the Highlands of Scotland, the Hebrides, and in the northern parts of England. This plant rises from two to five inches in height, and is in bloom from April to October. In the island of Raasay, in Ross-shire, and likewise in some other places, the inhabitants employ it as a substitute for alum, to fix the colour in dyeing. The Swedes make a decoction of it, and apply it to hogs and cattle, for the destruction of vermin. The Highlanders also occasionally take an infusion of it, as an emetic and cathartic, but it operates violently; and unless taken in a small dose, causes giddiness and convulsions.

CLUB-RUSH, or *Scirpus*, L. a native genus of plants, consisting of twelve species: the following are the principal:

1. The *palustris*, or marsh creeping club-rush, which thrives on the banks of rivers, ponds, and ditches, and is chiefly found in the western parts of England. It is perennial, grows from six inches to two feet high, flowers in the month of June or July. Hogs eagerly devour the roots of this species when fresh, but will not touch them when dry. They are also eaten by goats and horses, but refused by cows and sheep.

2. The *lacustris*. See Bull-rush.

3. The *maritimus*, or salt-marsh club-rush, which is found on the sea-coast near Yarmouth, and also near Shirley-wych, Stafford. It is perennial, and flowers in the month of July or August. Cows eat this plant; and its tuberous roots, when dried and ground to powder, have, in times of scarcity, been used as a good substitute for flour.

CLYSTERS, or Injections, or *Lavemens*, are liquid remedies introduced into the larger intestines, by the rectum. The most usual clystering machines are those consisting simply of the bladder of a hog, sheep or ox, in which an ivory pipe is fastened with pack-thread. A more convenient and durable sort is prepared of *India-rubber*, instead of a bladder; though the French and Germans employ, in preference, a long pewter syringe by which the liquor may, with more ease and expedition, be drawn in, and likewise more forcibly expelled, than from a bladder. Both methods, however, are in many instances liable to great objections, especially the former, which cannot be administered without the assistance of another person, even though the patient should possess sufficient strength and dexterity to perform the operation. Hence we cannot, in justice to Mr. Savigny, of King-street, Covent-garden, omit to mention his newly invented *machine for lavemens*; which, for simplicity of construction, facility in using it, cleanliness and durability, far surpasses every former contrivance. This machine is ingeniously adapted both for private use, and to admit of assistance. One of its essential advantages is, that the injection may be received into the body, without the least intervention of *air*; because the cylinder containing the liquid is provided

with a piston, which, by gently pressing it down upon the fluid, till it appears on the top of the ivory pipe, expels the air, and thus prevents its introduction into the bowels:....the whole apparatus, in a mahogany case, is sold by Mr. SAVIGNY, for one guinea and a half.

Clysters form a very important class of medicines, which, if properly understood and applied, might be effectually substituted for many remedies swallowed by the mouth, to the detriment of the stomach, as well as the whole animal economy. For Nature never intended, that the receptacle of nourishment should become the laboratory of drugs; the local effects of which, sooner or later, cannot fail to impair digestion, and lay the foundation of more serious evils than those deluded patients vainly imagined to remove. We shall not, however, in this place, expatiate upon the impropriety and absurdity of these practices, which more properly belong to the article QUACK-MEDICINES.

Clysters not only serve to evacuate the contents of the belly, in cases of obstinate costiveness, but also to convey into the system medicinal preparations of great activity. Thus opium, the Peruvian bark, &c. when they cannot be taken by the mouth, may be given in much larger doses, and with less danger: nay, the most nutritive and strengthening liquids may, in this manner, be administered to persons unable to swallow, so that their lives may be supported for many months, and even years, by means of clysters alone. In short, it may without hesitation be affirmed, that injections are more conformable to the intricate functions of the animal body, and doubtless safer, than the introduction of medicines by the stomach.

Although clysters should never be administered too *hot*, or too *cold*, yet there are certain complaints accompanied with such debility of the larger intestines, and the abdominal muscles, as renders the application of *cool* liquids sometimes necessary: such cases, however, must be determined by the experienced practitioner. In general, therefore, these remedies are given in a tepid or lukewarm state, that is, from the 80th to the 96th degree of FAHRENHEIT'S scale. The quantity used for adults, is from half a pint to one pint; and for children, according to their age, from two or three spoonfuls to half a pint.

Anodyne Clyster.....Take of either linseed-tea, or new milk, from half a pint or three quarters of a pint, and add from 40 to 60 drops of laudanum.

Laxative Clyster.....Milk and water, six ounces each; sweet oil, or fresh butter, two ounces; and if a stronger dose be required, add one ounce of GLAUBER'S salt, or two table spoonfuls of common salt. In inflammatory or putrid disorders, however, it will be more proper to inject a clyster composed of two-thirds of thin gruel, and one-third of strong vinegar.

For the various forms and ingredients of clysters, to answer different purposes, we refer to the articles, COLIC, COSTIVENESS, DYSENTERY, FLATULENCY, HYSTERICS, URINE, WORMS, &c.

COACHES, are covered vehicles for travelling, suspended on springs, and moved by wheels. Although these articles of convenience and luxury were not unknown to the

ancient Romans, yet the first coach appears to have been introduced into England by the Earl of ARUNDEL, who imported it from Germany, about the year 1580.

HACKNEY-COACHES, are those exposed to hire in the streets of London, as well as other large cities, and paid at certain rates, which are fixed by legal authority. The number of hackney-coaches allowed in London and Westminster, is 1000; which are licensed by Commissioners; and their proprietors pay a weekly duty of ten shillings. Numbers, painted on tin plates, are affixed to each coach-door; and their fares, or rates, are settled by parliament.

MAIL-COACHES, are post-carriages of a peculiar construction, being lighter, more elegant, and not so liable to be overturned as the common stage-coaches. For a certain consideration, they carry His Majesty's mails; are protected by a guard; and subject to the regulations of the post-office. The time of their arrival and departure is fixed; they are restricted to four inside passengers; generally travel seven miles in an hour; and have been found very serviceable to the commerce and correspondence of this country.

COAL, in mineralogy, a solid, inflammable, and bituminous substance, commonly used for fuel: it consists of various species; the principal of which are:

1. The *Lithantrax*, or Pit-coal; a black, solid, compact, but brittle mass, and moderately hard, which retains its solidity, when heated.... Its component parts, according to Mr. KIRWAN, are petrol, or asphaltum, mixed with a small portion of argillaceous earth, and frequently blended with pyrites, or fire-stone. A red tincture is extracted from this species of coal, by means of spirit of wine.

2. *Culm-coal*, which, together with a moderate quantity of petrol, has a larger proportion of argillaceous earth, and vitriolic acid, than the pit-coal, to which it bears a strong resemblance. Its texture is not so bright as that of the former species; and it burns with a flame, without being consumed, leaving a slate nearly of the same size as the original volume of the coal.

3. *Slate-coal*, which contains so large a quantity of argillaceous earth, that it has the appearance of common slate. It, nevertheless, burns by itself, with a flame, and is found principally in the quarries near Purbeck; and in such abundance, that the poorer class of inhabitants in that neighbourhood are wholly supplied with it, for their common fuel.

4. The *Ampelites*, or Canal-coal, is of a dull black colour, and easily breaks in every direction. It burns with a bright flame, but frequently flies to pieces in the fire: it may, however, be divested of this property, by being immersed in water for several hours, previously to its being used. As this coal is of an uniform, hard texture, it is readily turned on a lath, and takes a good polish. Hence, it is used for making various toys, which greatly resemble those manufactured from the finest jet.

5. *Kilkenny-coal* is the lightest of the various species of this fossil. Although containing the largest proportion of asphaltum, it emits less smoke and flame, produces a more intense degree of heat, and is more slowly consumed than the canal-coal. This valuable coal is

chiefly found in the county of Kilkenny, in Ireland.

These are the principal varieties of coal most commonly known; but they are not uniformly of the same kind or nature, in the different places where they are found. On the contrary, the various proportions and qualities of their ingredients, produce a great number of other varieties, which are calculated for different purposes, according to the quantity and quality of their contents. Hence it happens, that various kinds of coal are often found intermixed in one stratum, and some of the finer sorts frequently run like veins among the coarser species.

Coals are applied to various purposes, and are eminently useful in the smelting of ores, especially when burnt into *coke* (to which we refer); but, by these processes, considerable quantities of tar and pitch have hitherto been, inattentively, wasted. To obviate these losses, the ingenious Lord DUNDONALD erected ovens of a peculiar construction, for burning pit-coal into coke, and, at the same time, for collecting, in separate vessels, the volatile alkali, pitch, oil, and tar, which would otherwise have been dissipated. For this invention he obtained a patent, on the 30th of April, 1781, for 14 years; which term was afterwards, by an act of parliament, extended to 20 years, to commence from the 1st day of June, 1785. His ovens are so contrived, as to admit the external air to pass through the vessels, or buildings containing the coal, from which any of the above-mentioned substances are to be extracted. After being kindled, the coals are decomposed by a slow, but imperfect combustion, without dissipating the ingredients. The residuum in the oven, forms excellent cinders, or coke; while the volatile particles are condensed in reservoirs, placed at proper distances.

[Tar distilled from coal, was thought by Lord DUNDONALD, to be far superior to the common vegetable tar, in preserving timber from the effects of the weather, and the bottoms of ships from the destructive worm of the West Indies. Some comparative experiments were tried at New York about thirteen years since, by which it appeared, that boards covered with common tar, and sunk in the river for several months, were much eaten by worms, while a plank covered with the coal tar remained untouched. In consequence of this apparent proof of superiority, the bottoms of several vessels were coated with the tar, bought at the rate of 40 dollars per barrel. But the result of these trials has not served to extend and insure its character.

Capt. TRUXTON informed the editor, that he "applied it to the bottom of a ship, and discovered nothing in it like a safe-guard from the worm;" and added, "that some years after Capt. SARLEY, of New-York, commander of the ship America, payed all the timbers and planks of his vessel with it, as a preservative of the wood, and I was informed on the ship's return from her first voyage, that it had caused a manifest decay of the frame." From another source, the editor heard that the strong smell of the coal tar penetrated into the hold of the America, and impregnated the cargo of teas which was on board. A friend also informed him that, the coal tar, put on in this city, came off like a sheet of

limewash, and left his ship's bottom bare, at Demerara, where the worm commits great ravages, and greatly injured his vessel.]

It is a circumstance worthy of notice, that not less than 70 kinds of coal are brought to the London market; the value and prices of which differ, in general, from 1*s.* to 10*s.* and sometimes even 15*s.* in the chaldron, according to their qualities. About 45 of these various sorts are imported from Newcastle, and the remainder from Sunderland; the whole of which may be divided into four classes:

The *first* class contains only six kinds of coal; called Wall's-end, Bigg's-main, Walker's, Heaton-main, Willington, and Hebburn-main. The prices of these sorts vary, according to their abundance in the market, from 1*s.* to 3*s.* per chaldron; but they are generally upon a par, except the Wall's-end, which is mostly 6*d.* or 1*s.* dearer than the others.

The *second* class includes three sorts; all of which *run large.* They light and burn like a candle, and produce white ashes. These are usually mixed either with some of the first class, or with any of the strong sorts of the second, third, and fourth classes; because they run large, which makes them burn in a more lively manner. These three sorts are, Hartley, Coupen-main, and Blythe; and their price is generally from 2*s.* to 4*s.* more or less, below that of Wall's-end, according to their scarcity or abundance in the market. Next to these are twelve sorts, which possess nearly the same qualities as the best coals, but are in general smaller, and seldom vary more than 2*s.* in the chaldron, though they are usually from 3*s.* to 4*s.* in price under the Wall's-end.

The *third* class consists nearly of the same number as the second, and is likewise divided into two sorts: the first of which burns quickly, and produces white ashes; the other is very strong and good, but, at the same time, very small, and is used by smiths and manufacturers. The prices of this class of coals are generally from 4*s.* to 6*s.* per chaldron, more or less, under that of the Wall's-end, according to their abundance or scarcity.

Lastly, the *fourth* class contains all the remaining kinds of coal: they differ also in quality; some burn light, produce white ashes, are slaty, and very indifferent; others are small and strong, but not good enough for smiths. The price of these varies greatly, especially of the lighter kind. It is, in general, from 8*s.* to 10*s.* and even 15*s.* lower than the Wall's-end. These different classes, and particularly some of the inferior sorts, are frequently mixed together, and thus afford an opportunity of changing the prices of coal; this, however, is always to the loss of the consumer, who loses 10*s.* or more in the *quality*, in the hope of saving 4*s.* or 6*s.* in the *price.*

The following is a striking instance of the great variation to be found in the quality of coal: in weighing different kinds of that fossil, there was the surprising difference of 30lbs. in the weight of two sacks, which were equally filled.

All the coals brought to the London market are publicly sold, only by the whole, half, or quarter ship. Those who have neither craft nor wharfs to unload, at the

rate of 40 chaldrons per day, purchase from some of the greatest coal-merchants: this is called *loading on account*; and the former pay 1s. per chaldron for commission.

Pool-measure is one-fourth of a chaldron extra, on any five chaldrons; and a room of coals of $5\frac{1}{4}$ chaldrons, contains about 68 sacks of three bushels each, or somewhat less; but this quantity may be divided into from 70 to 90 sacks, if they are filled up, and not measured by the bushel, under the inspection of a sworn meter. The pool-measure therefore, being larger than the bushel measure, the profit of a coal-merchant may be estimated, upon an average, at five sacks upon five chaldrons, that is, at about 8 per cent.

Coals constitute one of the chief articles of domestic convenience, especially during the severity of winter. Hence, in that season, they frequently become extremely scarce, and are sold at an extravagant price. To remedy this evil, in some measure, a preparation of clay and coal-dust has been successfully employed; of which we shall communicate the following particulars.

Coal-Balls: Take two-thirds of soft, mellow clay (for instance, a ton), which is free from stones, and work into it three or four bushels of small sea-coal previously sifted; form this composition into balls, or cakes, about three or four inches in diameter, and let them be thoroughly dried. When the fire burns clear, place four or five of these balls in the front of the grate, where they will soon become red, and yield a clear and strong heat, till they are totally consumed. The expence of a ton of this composition is but trifling, when compared with that of a chaldron of coals, as it may be prepared at one-fourth of the cost, and will be of greater service than a chaldron and a half of the latter.

A similar kind of fuel is prepared in the Bishopric of Liege, and is a source of considerable emolument to the inhabitants, who sell great quantities of it annually. A correspondent in the second volume of the "*Museum Rusticum*, &c." mentions this preparation, and adds, that he has seen several fires of it burning in the house at that time occupied by the Royal Society, in Crane-court, Fleet-street. We therefore seriously recommend this article to the attention of those, who, together with the ability, possess the means of alleviating the wants of others.

A patent was granted, in the year 1800, to Mr. Frederic, of Wellbeck-street, for his invention of a fuel, which burns longer than the common coal. As the patentee has published part of the process, in a separate treatise, we shall extract from it the following particulars: The principal ingredient is clay, or where that cannot be procured, cow-dung, road, or street mud, saw-dust, turf, horse-dung, straw, and especially tanners' waste; to which may be added, broken glass pulverized, or pitch, tar, oil-cakes, or any other combustible matter, that is not too expensive. These are to be mixed with coal-dust, in circular pits, five or six feet in diameter, and paved at the bottom with bricks. In one of these pits, some clay should be previously softened with water, and well worked with an iron rake; after which operation, any other of the ingredients may be added in the following manner: Two men

provided with a pail, should first fill one of the pits a foot deep with clay, and throw in the small coal, together with the other ingredients, according to the quantity and proportion required. The whole should then be stirred repeatedly with a large rake, and the pit progressively be filled up, till the clay becomes so thoroughly incorporated with the other substances, and acquires such a degree of consistence, that it can no longer be stirred..... More clay should be added; and the same operation repeated till the pit is full; when the mixture should remain in it, till the water is in a great measure evaporated, and the composition becomes fit for use; during which time another pit may be filled in a similar manner.

When the mixture has acquired a sufficient degree of consistence, and is ready to be formed into cakes, a mould made of [fir] four cubic inches square, should be prepared and previously wetted, to prevent the mass from adhering to it; but, before this composition be put into the mould, Mr. FREDERIC recommends saw-dust to be spread over it, by means of which the cakes will dry more quickly, and burn much better. The last operation is that of drying, which should be effected in a shed, about seven feet high, and as long as may be necessary. The cakes may also be dried on the ground, in the open air, but as they are liable to be wetted by rain, the labour already bestowed upon them would be useless. A shed, therefore, if it can be procured, is most eligible, and should be divided into upright rows six or seven feet high, about three inches thick, and three feet distant; being intersected every six inches by a cross bar twelve inches in length, for receiving, on both sides, laths of about three quarters of an inch thick; and which should be about two inches and a half apart. On these laths, the cakes are to be laid for drying, which, during the summer, will take place in less than a week.

This invention, we conceive, is of considerable utility, and reflects great credit on the patentee, who has voluntarily consented to relinquish his privilege, and offered to explain his process to any public establishment, or charity, that may be inclined to prepare these cakes, upon a large scale, so as to sell them at a reduced price, and thus furnish the poor with that most necessary article of domestic comfort, fuel.

Use of coals as manure. The first experiments for ascertaining the effect of pounded coals, or their ashes, on the fertility of meadows and corn-fields, we believe, were made in Germany, by Counsellor STUMPF, about the year 1791. On account of the vitriolic acid contained in coals, they are, for this purpose, superior to gypsum, especially on cold, calcareous soils...... According to his directions, the coal-dust, or powder, ought to be scattered on the fields, late in autumn, about the thickness of the back of an ordinary knife, so that he employed about four cwt. of coal to manure a German acre of 180 square roods, Rhenish measure. But, as there is a great difference between those coals, the residue of which, after burning, consists of *calcareous* earth, or stone, and others, which leave an aluminous slate; he advises the agriculturist to make use of the former kind for every species of clover and grasses, as well as for wheat, rye,

barley, oats, or similar grain; and to avail himself of the latter in the culture of spelt, buck-wheat, as likewise of clover, and the different species of grain, but particularly of all the leguminous fruit, such as peas, beans, &c.

Small-coal, is a kind of charcoal, prepared from the spray and brushwood, stripped off the branches of coppice wood, which are sometimes tied up in bundles for that purpose, and sometimes charred, without being tied; which operation is called *coming it together*.

[The United States abound with various kinds of excellent coal. In the western counties of Pennsylvania, on the banks of the Schuylkill, and in Virginia, there are immense beds; it has also been lately found on the river Rariton, New Jersey. A few years ago, a body of coal was discovered in the county of Northampton, Pennsylvania, upon the river Lehigh, of a bright black shining appearance. It gives an intense heat, emits very little smoke, but requires a strong blast to inflame it. This mine will one day certainly prove a source of infinite convenience to Philadelphia: for it requires but little foresight to be able to assert, that at the rate we go on in wasting wood, it will be in a few years out of the power of the majority of the people to use it for common fuel. The river Lehigh, at present is not sufficiently clear of obstructions, to enable the proprietors of the mine to bring the coal down to Philadelphia, but a lottery is now on foot to raise the necessary sum to render the river navigable, and it is to be hoped the proprietors will be enabled to accomplish the important object.

Of the Virginia coal brought to Philadelphia, that from Graham's mine is the best. It sells generally for $\frac{25}{100}$ per bushel.

It may be useful to mention that coal preserved in magazines, when not duly ventilated, has inflamed. This accident once happened at Brest, in France.

In England and France (according to St. Fond), the best coal is found under freestone. The latteral straggling veins of coal, must not be attended to, when digging for coal, but the perpendicular direction pursued: eighty or one hundred feet are sometimes to be penetrated before the main body of coal will be found.

The burning of coal has been supposed to contribute to the healthiness of the cities of England and Scotland, where pestilential diseases prevailed much more formerly, before the forests were carefully preserved, than since the general introduction of coal. The city of Richmond, in Virginia, has been referred to, as an example of the febrifuge operation of the smoke of coal; the febrile ailments of its inhabitants having greatly lessened since their fires were generally made of that material.

Dr. Mitchell supposes that coal acts in thus keeping away diseases, by the *volatile alkali* it affords in combustion, destroying the acidity, which, he imagines, exists in the atmospheres of cities, arising from the putrefactive processes constantly going on.]

COBALT, a semi-metal of a whitish-grey colour, and nearly resembling fine hardened steel: it is as difficult to be fused as copper, or even gold; and cannot be easily calcined. If the calx, resulting from that process, be melted with borax, pot-ash, or siliceous sand, it affords the blue glass, denomi-

nated by artists, *smalt*, which is principally employed in painting enamel, and in tinging other glass, being of all colours the most fixed in the fire. This semi-metal abounds in England, chiefly in the Mendip Hills in Somersetshire, and also in Cornwall, where it has lately been dug up in large quantities, and turned to considerable emolument.

[COBWEBS, which bespread the ground in autumn, have been supposed, in North Carolina, to cause the *staggers* among horses; but whether they are taken through the nose, or mouth, or both, seems to be yet unsettled. There is an interesting paper, on this subject, in the "*Recreations*" of Dr. ANDERSON, vol. i. but the discussion of the question may be properly deferred until we come to the article *Staggers*, by which time, the editor is in hopes to be possessed of some additional information on the subject. In the mean time, any facts respecting it shall be thankfully received.]

COCCULUS *Indicus*, or INDIAN BERRY, is the poisonous fruit of the *Menispermum*, L. or Moon-seed, an exotic genus of plants, growing in the southern parts of Europe, whence it is imported. It possesses an intoxicating property, and is on that account too frequently mixed with malt liquors, though such nefarious practice is expressly prohibited by act of parliament. The seeds of this plant are made into a paste in the Levant, where it is employed as a specific for cutaneous eruptions.

[To the great scandal of some brewers, this drug is sometimes mixed with small beer, by which means it acquires an intoxicating quality, and enables them to assert the superiority of their manufacture over that of the rest of the trade, though they profess to use a smaller quantity of malt.]

COCCUS, a genus of insects, comprising twenty-two species, which are principally denominated from the plants they frequent. The most remarkable of these are:

1. The *Coccus hesperidum*, or green-house bug, which chiefly infests orange, and other plants in green-houses. When young, it runs upon the trees, but afterwards settles on some leaf, where it deposits a great number of eggs, and dies.

2. The *Coccus malorum*, or apple-tree Coccus, which, as soon as it fixes on a tree, communicates a corrosive ichor, that affects the bark, even after the insect is removed, in a manner similar to a gangrene; so that it becomes blotched, and full of deep holes, in consequence of which, it decays and dies. This insect preferably attacks the tender buds of young trees, and may be easily removed by means of a hard painter's brush, without injury to the plant, if it has not had sufficient time to bury itself in the bark. It also settles in such cavities as are frequently produced in the stems of trees, by incautiously tearing off the branches, or by any other wound. Being thus protected from the rain, these vermin can only be eradicated, by scooping them out, cutting off every irregular prominence, scraping off all loose scales from the bark, and then covering it with Mr. FORSYTH's composition, which will not only defend it against their devastations, but, by bringing on a smooth, clean bark, will admit of its being washed and cleaned afterwards, without difficulty. This process will pre-

serve the tree, both from the depredations of these insects, and from those of many others, which shelter themselves in the inequalities of a rough bark, and will, at the same time, give it additional health and vigour. See vol. i. article APPLES.

3. The *Peach Coccus*, which Dr. ANDERSON calls gall-nut, settles only on the twigs of peach-trees, where it deposits innumerable eggs. These may be eradicated by carefully brushing the twigs, in the spring, with a hard brush, in the direction of the buds; by which simple means many of them may be detached, and their numbers greatly reduced. Where the insects are very close together at the points of the twigs, the latter may be cut off, and carried out of the garden; for, if thrown on the ground the former will re-ascend. But, if they are exceedingly numerous, all the young trees may even be lopped, especially if Mr. FORSYTH's plaster be applied to the wounds. Although by this operation, the fruit will be lost for that season, yet the tree will acquire considerable strength, and be in the finest order next year. Notwithstanding all these precautions, it will be necessary to examine the tree, with the utmost attention, towards the end of April, or beginning of May: for, at that season, the female vermin attain their full growth, so as to be easily perceptible; when each of them should be carefully detached from the branch to which it adheres, by means of a blunt knife with a very thin blade; then deposited in a vessel, and removed from the garden.

Naturalists have computed, that the generation of 3,000 insects will be prevented by the destruction of each female gall-nut, so that great progress may be made in a very short time. Thus, if that necessary operation be performed with care, very few will escape; and if the eggs also be properly extirpated, all future trouble respecting this insect will be effectually obviated.

4. The *Coccus Phalaridis*, which is found on the *phalaris* or canary-grass, and is originally a native of the Canary Islands, but has become naturalized.

5. The *Coccus Cacti*, or cochineal insect, which is a native of the warmer parts of America. See COCHINEAL.

6. The *Coccus Ilicis*, or kermes, which inhabits a species of oak, called *quercus coccifera*, and is a native of the southern parts of Europe. It is used in dyeing a deep red colour.

7. The *Coccus Lacca*, or gum-lac animal, a native of the East Indies. See GUM-LAC.

8. The *Coccus Polonicus*, or scarlet grain of Poland, is found there in great abundance on the roots of the *polygonum cocciferum*. It is also called the *cochineal of the north*; as, contrary to the nature of the American insect, it thrives only in cold climates. It is collected for the use of dyers; though it yields not only smaller crops, and is gathered with more difficulty, but the drug also is much inferior to the true cochineal.

COCHINEAL, a drug used by dyers for imparting red colours, and also for the purpose of making *carmine*. It consists of an insect which is collected from the *cactus cochenillifer*, or, as it is differently called, *nopal*, or, *nopalleca*, the Indian fig-tree; and is found most abundantly in the provinces of Oaxaca, Tlascala, and Chiapa, in South America. It is nourished solely by the juice of the plant on

which it breeds, and which becomes converted into its substance, yielding a most beautiful scarlet and crimson colour.

The cochineal insects are usually gathered in the beginning of August, when they are killed, either by being immersed in hot water, or put into an oven moderately heated for that purpose; or, more advantageously, by being exposed to the scorching rays of the sun....The last mentioned method is reputed to be of superior efficacy for preserving the colouring property; and the cochineal thus treated, is of a shining silver grey. More than one million of pounds of this drug are annually imported into Europe; and it pays at present, in this country, only a convoy duty of 10d. per pound: the best sort was lately sold at from 15s. to one guinea the lb.....It is remarkable, that these worms may be kept in a dry state for more than a hundred years, without being in the least affected by the tooth of time.

[The true Cochineal was found by the late industrious Dr. Garden, in South Carolina, and sent to England, to Mr. Ellis. Mr. Raphael Peale of Philadelphia, also asserts, that he found it upon the island of Little St. Simons, on the coast of Georgia. The cultivation of this insect, and of the *Cactus Cocchinelifer* plant ought to be encouraged by the southern planters, as a source of revenue, in case their crops of rice should fail, from vicissitudes in the season, or cotton, from frost or caterpillars. Spanish America derives an immense revenue from the Cochineal, and from this circumstance, it is probable, that little trouble is requisite in the business of attending the insect.]

COCK, or *Gallus*, L. a species of the *phasianus*, too well known to require any description. The cock was first introduced into Europe from Persia, and is eminently distinguished for his courage, especially when opposed to one of his own species. Advantage has been taken of this peculiarity, and, to the disgrace of mankind, the brutal practice of *cock-fighting* has been reduced to a regular system. In some parts of Asia, cock-fighting furnishes amusement to kings and princes; and, though it is evidently on the decline in this country, yet it imperiously demands the attention of an enlightened legislature, to eradicate totally this inhuman custom.

[COCK. Under the article TAPPING, we shall give an account of a most ingenious improvement in this contrivance, intended to render the vent in the tops of beer barrels unnecessary, and thus to preserve the briskness of that liquor, which is so frequently rendered vapid by servants carelessly omitting to put the plug into the vent hole, when they have finished drawing the liquor.

This improvement, which is far superior to the common English patent cock, is the invention of Mr. ROBERT HARE, jun. of Philadelphia, who has rendered such important services to the science of chemistry, by his hydrostatic blowpipe, mentioned in Vol. I. p. 320.]

COCK-CHAFER. See CHAFER.

COCKLE. See CORN-COCKLE.

COCKLE, or *Cardium*, L. a genus of small shell-fish, consisting of twenty-one species. They are commonly found on sandy coasts, and furnish a wholesome and agreeable food. When consumed in a raw state, cockles are supposed to produce poisonous ef-

fects: and, though we have no positive proofs in confirmation of this conjecture, it will be more prudent to boil and eat them with the addition of a little pepper and vinegar, or at least the latter, which at the same time promotes their digestion.

COCKROACH, or *Blatta*, L. a genus of insects, resembling the beetle, and consisting of ten species, the most remarkable of which is the *orientalis*, or eastern cockroach. These insects are frequently found in America; they penetrate chests, drawers, &c. and do considerable injury to clothes. They seldom appear till night, when they infest beds, and bite very severely, leaving an unpleasant smell. Their food is bread, meat, whether raw or dressed, linen, books, silkworms, and their cods, &c.....According to Sir HANS SLOANE, the Indians mix the ashes of the cockroach with sugar, and apply them to ulcers, in order to promote their suppuration.

COCK's-FOOT, or Cock's-foot Grass, or *Dactylis*, L. a genus of plants comprising seven species; of which two are indigenous :..... 1. The *Stricta*, or Smooth Cock's-foot Grass, which grows in marshes, and on the sea-coast. It is principally found in the eastern and southern parts of England, is perennial, and flowers in the month of August. 2. The *Glomerata*, or Rough Cock's-foot Grass, which thrives in pastures and in shady places, under the drippings of trees. This plant is also perennial, is in flower from June to August, and grows to the height of four or five feet, when seeding. It is somewhat coarse, but very luxuriant, especially in the leaves, which are often two feet long: they are eaten by horses, sheep, and goats, but particularly by cows, which are extremely fond of them, when growing on a rich soil. Dogs and cats instinctively search for and swallow this herb, when they incline to vomit, or to envelope the splinters of bones collected in their stomach.

This vegetable is propagated by sowing its seed in moist pastures, and marshy situations. Although its culture is at present very limited, yet as it grows with uncommon rapidity, and withstands the severest droughts, when almost every other plant is scorched, we anxiously recommend its culture to the attention of farmers.

[The three following species are natives of the U. S.

1. D. *Cynosuroides Amer.* c. foot grass. Spikes, six or more, scattered numerous, flowers closely imbricate and pointing one way; culm, two feet high, reedy, leaves on culm, six, calyxes, one flowered, pestills villose, very long. Perennial 2. D. *patens*. Spreading c. foot grass, spikes scattered, turned one way, five; flowers closely imbricate, culm decumbent, leaves spreading very much.

3. D. *glomerata*: or orchard grass: which shall be particularly mentioned under the Head GRASS.]

COCK'S-HEAD. See Common SAINTFOIN.

COCOA, or *Cocos*, L. a native tree of the East and West Indies, where it is of the greatest use to the inhabitants. It frequently grows to the height of 60 or 70 feet in the trunk, and delights in a moist sandy soil, especially near banks of rivers and the sea coast, where it is propagated by planting its ripe and fresh nuts, that generally come up in the course of six weeks or two months. Each branch produces

from ten to twenty nuts, which, when half ripe, contain a sweet milky liquor, well calculated to quench thirst, and of great service in many diseases of a putrid and inflammatory tendency. If the nuts are allowed to become ripe on the tree, this liquor hardens into a kernel, which is partly eaten raw, and partly expressed and converted into an oil, that forms an important branch of trade in the Indies. Of the sap, obtained by incision from the *spatha*, or flower-sheath, the natives prepare wine, vinegar, arrack, and sugar.

The leaves of the cocoa-tree are upwards of ten feet long, and thirty inches broad. It presents a constant succession of blossoms and fruit, nearly throughout the year: its trunk serves for timber and cabinet-ware; from the leaves are manufactured, baskets, hats, sail-cloth, mats, parasols, shingles for covering houses, paper, &c.

[The milk of the Cocoa-nut is used in the West Indies to allay vomiting in fever. It is given in doses of a table spoonful.]

COD, the Common, or *Gadus Morhua*, L. an inhabitant of the ocean, which is from two to four feet long, and weighs from 12 to 20lbs: it is found only in the northern parts of the world, between the latitudes of 66 and 50 degrees. The principal fishery for cod, is on the banks of Newfoundland, where they are caught in numbers sufficient to furnish employ for nearly 15,000 British seamen, and to afford subsistence to a still more numerous body of people at home, who are engaged in the various manufactures, which so extensive a fishery demands.

The food of the cod consists of small fish, worms, crabs, &c.: their digestion is so vigorous, as to dissolve the greatest part of the shells they swallow. Hence they are extremely voracious, and catch at any small object they perceive agitated by the water, even stones and pebbles, which are frequently found in their stomachs. Of the salted roe of this fish, not less than fifteen ship-loads are said to be annually exported from Norway to France; whose fishermen employ that substance for the taking of anchovies in the Mediterranean. From the liver of cod, a very good train-oil is obtained; and the tongues, when salted, are esteemed a great delicacy, and therefore often imported from Newfoundland. Isinglass is also prepared from their air-bladders, by the fishermen of Iceland; a process which peculiarly merits the attention of the inhabitants of the north of Scotland, where these fish are caught in great abundance. ....See Isinglass.

[At the first discovery of the northern continent of America, few or no cod-fish were found to the southward of the banks of Newfoundland and Sable Island. About 35 or 40 years ago, they were first discovered off Sandy Hook, in the vicinity of New York. It has been observed, that ever since that time, they have gradually become more and more abundant on the fishing ground of the Neversink in 6, 7 and 8 fathoms water, and perhaps equally so many miles farther Eastward. A few years since they appeared about the Capes of Delaware Bay, though in comparatively small quantities; and, it is said, that they have been caught on Chingoteague shoals in lat. 38. on the coast of Maryland. From these facts, it seems probable that the cod-fish is gradually progressing

Southward, and in time may, perhaps, be caught along the whole extent of coast belonging to the United States. Hence we may conclude that they originally inhabited the Banks of Newfoundland, whence on account of their prodigious increase, they annually push out colonies in every direction, where sustenance can be procured.]

Codded Mouse-Ear. See Common Wall-Cress.

Codlings and Cream. See Willow-Herb, the Great Hairy, or Large-flowered.

COFFEE-TREE, or *Coffea*, L. a shrub from twelve to eighteen feet high, and originally a native of Arabia, but is now cultivated in Persia, the East and West Indies, and several parts of America: it is also reared in the botanic gardens of Europe. Its evergreen foliage resembles that of the laurel; and at the base of the leaves appear, twice annually, white fragrant flowers, which are succeeded by a fruit resembling cherries, but of an unpleasant sweetish taste, each containing two kernels, or berries. They grow in clusters; and, when of a deep red colour, and gathered, are carried to a mill, in order to be manufactured into *coffee-beans*.

There are three principal sorts of this drug known in commerce: 1. The Arabian, or Mokha coffee, imported from the Levant; and which, on account of its superior flavour, is the most esteemed; 2. The East Indian; and, 3. The West Indian coffee of the French, English, and Dutch settlements: among the latter sorts, that of Martinico is generally preferred. Beside the importation and convoy duties, there is an excise laid on all the coffee consumed in this country, of 1s. 1d. per pound, if imported from the British colonies in America; and 2s. 2½d. if the produce of any other places.

Coffee frequently contracts an unpleasant flavour, when stowed in ships with rum, pepper, or any other article possessing a peculiar smell; a circumstance to which the inferiority of our Jamaica and East Indian coffee may, in a great measure, be attributed. To obviate such damage, the berries ought to be well dried in the sun, before they are shipped in separate vessels, or properly secured, if they are imported together with other merchandize. But, when they have once acquired a disagreeable flavour, it will be necessary to pour boiling water over them, and afterwards to dry them completely in the open air, previously to their being roasted. The colour of a watery infusion, may also serve as a tolerable test for ascertaining the quality of coffee, for if cold water, after standing for several hours over the raw berries, acquire a deep citron colour, we may conclude that the coffee has not been damaged, or adulterated.

Since the introduction of coffee into Europe, in the 16th century, various substitutes have been devised for this drug; such as acorns (which see), beet, succory-root, scorzonera, &c. Among the different species of the beet root, the *beta cicla v. albissima*, or the root of scarcity, has been preferably recommended for this purpose; and, after having previously extracted the saccharine particles, it ought to be carefully dried and roasted over a moderate fire. It seems, however, doubtful whether the expence and labour necessarily attendant on such preparations, may be adequate to the advantage thus ob-

tained: hence we are of opinion, that the most effectual method of rendering coffee *cheaper*, and preventing its importation, at least for *home consumption*, would be that of rearing this *hardy* shrub in our own climate. To encourage those who are desirous of making this patriotic experiment, we shall communicate the following particulars; on the authenticity of which the reader may fully depend:....A nobleman in Germany found, in a bag of raw coffee, twenty green berries, resembling oblong cherries, and each of which contained two beans. In March 1788, he planted them in a common garden-bed, two inches deep. In April it snowed, and was so cold, that the windows were covered with ice, for two days. Notwithstanding this unfavourable prospect, five of the berries appeared above ground in the latter part of June, and all the others previous to the middle of July. They grew rapidly, being in a shady situation, and a soil somewhat sandy, but well manured. In September of the same year, they had attained a height of about six inches, and dropped their small leaves about Michaelmas. During the winter, he covered them with a little hay, and afterwards with snow; both of which were removed in the fine weather of April. In this simple manner, they were defended against the severity of German winters; and in the fifth year, four of the little trees produced together seventy-six berries. By the inattention of the gardener, two of the plants died in the very hard frosts of 1798; yet the remaining eighteen were all in blossom the ensuing spring, and yielded, in autumn, three pounds and a half of coffee-berries; the flavour of which was not inferior to that imported from the island of Martinico.

With respect to the medicinal properties of coffee, it is in general excitant and stimulating, though we doubt whether it relaxes the animal fibres, as has by some authors been supposed. Its more or less wholesome effect greatly depends on the climate, as well as the age, constitution, and other peculiarities of the individual. Hence it cannot be recommended to children, or persons of a hot, choleric, nervous, or phthisical habit; nor will it be so safe and useful in warm as in cold and temperate climates; but to the phlegmatic and sedentary, a cup of coffee, one or two hours after a meal, or, which is still better, one hour before it, may be of service to promote digestion, and prevent or remove a propensity to sleep. In cases of spasmodic asthma, hypochondriasis, scrophula, diarrhœa, agues, and particularly against narcotic poisons, such as opium, hemlock, &c. coffee often produces the best effects: nor is there a *domestic* remedy, better adapted to relieve periodical head-achs which proceed from want of tone, or from debility of the stomach.

[The heaviness, head-ach, giddiness, sickness, and nervous affections, which attack some persons in the morning, after taking an opiate at night, are abated by a cup or two of strong coffee.

An experiment ought to be made on a small scale, of the coffee plant at St. Marys in Georgia and in the Mississippi territory.]

COFFIN, a chest in which dead bodies are interred.

In ancient times, the burying of deceased persons in coffins, was

considered as a mark of the highest distinction. But, in Britain, the poorer classes of people are thus interred; and, if the relations of the deceased cannot afford a coffin, it is furnished at the expence of the parish. According to THEVENOT, however, the Eastern nations, whether Turks or Christians, make use of no coffins.

As there appears to prevail a most iniquitous practice, of which no feeling mind can approve, that of robbing graves of corpses, for the purpose of anatomical dissection, we shall present our readers with a short description of the patent granted in July, 1796, to Mr. GABRIEL AUGHTIE, of Cheapside, London, for his improvement in coffins, to prevent the stealing of bodies from them, after interment: this patent has since been assigned to Messrs. JARVIS and Son, undertakers, &c. Charing-cross, and Great Mary-le-bone-street.

The coffin may be made of any kind of wood, and bound with steel, iron, or other metal. The sides are to be curved without saw-curfs; and on the top-edge of each side are to be three or more boxes, of iron, steel, or other metal, let in on the inside of the coffin, to receive the springs fixed to the lid; one box to contain a spring on the top edge of the head, and another on the foot, for the same purpose..... The screws for fastening down the lid, pass through an iron or metal plate, with a socket, to receive the head, and to prevent its being drawn out by any kind of instrument...... These screws are to be placed between each of the springs, in proportion to the number of the latter, and the size of the coffin. The lid is also to be bound with steel, iron, or any other kind of metal, to prevent it from being cut or broke open; and the screws used for fastening it, are to be sunk about half the thickness of the lid. Such screws are not to be notched on the head, but some of them divided with two, and others with four bevils; so that when they are once fixed, it will be impossible to unscrew them; as, by turning the reverse way, there is no hold for any tool to withdraw them.

Many of our readers will, probably, remember that the late Emperor of Germany, JOSEPH II. about the year 1781, enacted a law, by which the interment of dead bodies in coffins was prohibited; nay, it was ordered that they should be buried in bags, and covered with quick-lime, in order to promote their putrefaction, and prevent the exhalation of noxious vapours...... This severe regulation, however, met with so universal and decided an opposition, that the enlightened monarch, from prudential motives, was speedily induced to repeal it.

Although we are no advocates for arbitrary measures, by which the feelings of humanity may be wounded, yet, on the other hand, we are firmly persuaded that the custom of interring numerous bodies, in the churches and church-yards of populous towns, is attended with effects highly injurious to the living. [See article BURIAL.] And as persuasion and reasoning, when opposed to inveterate prejudices, are not likely to produce a favourable effect on intellects but little improved by education, we venture to suggest a remedy, than which none can be more reasonable, and less oppressive: 1. That, though all deceased bodies, are to be considered as inviolable, yet the privilege of being deposited in a

coffin (whether kept above or under ground), *in towns* shall be conferred only on those who have rendered themselves worthy of such a distinction, by virtuous and patriotic actions; and, 2. That all others, including children and adults, shall either be buried at a certain distance from inhabited places, or at least twenty feet deep, if their relations are anxious to see them interred in towns or villages. See Burial, and Burying-ground.

COIN, a piece of metal converted into money, by the impression of certain marks or figures.

Coin differs from money, as the species from the genus. The latter may consist of any substance, whether metal, wood, leather, glass, horn paper, fruits, shells; in short, whatever is current as a medium in commerce. The former is a particular specie, always made of metal, and struck according to a certain process, called coining.

The first money in commerce was, doubtless, barter, that is, the exchanging of one commodity for another of equal value; and from the difficulty necessarily attendant on the cutting or dividing of certain commodities, men were first induced to invent a substitute for them, that should serve as a general medium. Such is the origin of coin, which varies in different countries, according to the relative value of the different metals of which specie is composed.

Severe punishments are inflicted on those who are guilty of counterfeiting, debasing, or even clipping the current coin of the United States.

A method of taking off casts from coins: On account of the great value of antique coins, and the difficulty with which they are obtained, few persons have it in their power to procure a complete series. We, therefore, communicate the following mode, by which that desirable object may be obtained, and the industrious antiquary enabled to ascertain many disputed points in history.

The method of taking off impressions, by means of plaster of Paris and sulphur, is well known; but as the former is too soft, and the latter too brittle, they can be preserved only for a short period. This difficulty may be obviated by laying a coat of the finest tin-foil over the medal intended to be taken off, and rubbing it gently with a brush, till it has received a perfect impression, when the edge of it should be pared, so as to render it of the same circumference. The medal should then be reversed, when the tin-foil will fall into a mould ready to receive it, the concave side being uppermost. Plaster of Paris may be poured upon this, in the usual manner; and, when dry, the cast figure should be taken out, with the tin-foil adhering to it; the convex side being uppermost. In this position, it should be kept in the cabinet; and if it receive no external injury, will endure for ages.

A TABLE of the Weight and Value of Coins, as they pass in the respective States of the Union, with their Sterling and Federal value.

Names of Coins.	Weight.	Standard	Sterling Money of Great Britain.			New Hampshire Massachusetts, Rhode Island, Connecticut, & Virginia.			New York and North Carolina.			New Jersey, Pennsylvania Delaware, and Maryland.			South Carolina and Georgia.			Federal value.				
																		Eagles.	Dollars.	Dimes.	Cents.	Mills.
(Gold.)	dwt.	gr.	L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.	L.	s.	d.	E.	D.	d.	c.	m.
A Johannes,	18	0	3	12	0	4	16	0	6	8	0	6	0	0	4	0	0	1	6,	0	0	0
An half Johannes,	9	0	1	16	0	2	8	0	3	4	0	3	0	0	2	0	0		8,	0	0	0
A Doubloon,	16	21	3	6	0	4	8	0	5	16	0	5	12	6	3	10	0	1	4,	9	3	3
A Moidore,	6	18	1	7	0	1	16	0	2	8	0	2	5	0	1	8	0		6,	0	0	0
An English Guinea	5	6	1	1	0	1	8	0	1	17	0	1	15	0	1	1	9		4,	6	6	7
A French Guinea,	5	5	1	1	0	1	7	6	1	16	0	1	14	6	1	1	5		4,	6	0	0
A Spanish Pistole,	4	6	0	16	6	1	2	0	1	9	0	1	8	0	0	18	0		3,	7	7	3
A French Pistole,	4	4	0	16	0	1	2	0	1	8	0	1	7	6	0	17	6		3,	6	6	7
(Silver.)																						
An English or French Crown,	19	0	0	5	0	0	6	8	0	8	9	0	8	3	0	5	0		1,	1	0	0
The Dollar of Spain Sweden or Denmark	17	6	0	4	6	0	6	0	0	8	0	0	7	6	0	4	8		1,	0	0	0
An English shilling	3	18	0	1	0	0	1	4	0	1	9	0	1	8	0	1	0		0,	2	2	2
A Pistareen,	3	11	0	0	$10\frac{3}{4}$	0	1	2	0	1	7	0	1	6	0	0	11		0,	2	0	0

A TABLE of other foreign coins, &c. with their value in Federal Money, as established by a late act of Congress.

	E.D.d.c.m.
Pound Sterling,	0 4, 4 4 0
Pound of Ireland,	0 4, 1 0 0
Pagoda of India,	0 1, 9 4 0
Tale of China,	0 1, 4 8 0
Mill-ree of Portugal,	0 1, 2 4 0
Ruble of Russia	0 0, 6 6 0
Rupee of Bengal	0 0, 5 5 5
The Guilder of the United Netherlands,	0 0, 3 9 0

	E.D.d.c.m
Mark Banco of Hamburg,	0 0, 3 3 5
Livre Tournois of France,	0 0, 1 8 5
Real Plate of Spain,	0 0, 1 0 0

The different weights of the Federal Coins.

	Pure gold.	Standard do.
	dwts. grs.	*dwts. grs.*
An Eagle	10 7 4-8	11 6
Half do.	5 3 6-8	5 15
Qur. do.	2 13 7-8	2 19 4-8
Dollars	15 11 4-16	17 8
Half do.	7 17 10-16	8 16
Qur. do.	3 20 13-16	4 8
Dimes	1 13 2-16	1 17 3-5
Half do.	0 18 9-16	20 4-5
Cents	8 16 of copper.	
Half do.	4 8	

The standard for silver coins 1438 parts of pure silver to 179 parts of alloy, which is to be wholly of copper, or 11 and 1.

All other gold coin of equal fineness, to be valued at 89 cents per dwt. and all other silver coin of the same fineness at 111 cents per oz.

A mill is the lowest money of account....one thousand being equal to the Federal Dollar, Unit 0,001. A cent is the highest copper coin, one hundred being equal to a dollar 0,01.]

COKE, is fossil-coal charred, or having undergone a process similar to that by which charcoal is made. By this operation, coals are divested of their humidity, their acid liquor, and part of their fluid oil. They are principally used, where it is necessary to excite intense heat, as for the smelting of iron ore, and for processes in which the acid and oily particles would be detrimental, as in the drying of malt.

Coke-oven is a kind of furnace, of a circular structure, erected for the purpose of converting coal into coke. Such ovens may, however, at the same time be applied to other purposes. On this account, a patent was granted to the Right Hon. Henry Seymour Conway, in June 1789, for his method of adapting, or conveying the heat arising from the fire of coal, employed in coke-ovens, for working steam-engines, baking bread, &c. calcining and fusing ores and metals, also for warming rooms, &c. heating water for baths, and for many other useful purposes, by which means the expence of the coal or other fuel is entirely, or in the greatest part, saved.

The leading principle of this patent appears to be the constructing of flues, both beneath and on the sides of the oven; in which registers are inserted. By means of these, the heat is conveyed to the steam-engines, baking-ovens, &c. which are built upon and against the sides of the coke-ovens, and may be increased or diminished at pleasure, by opening or shutting the registers; the same fire serving both to burn the coke, and to communicate the requisite degree of heat.

[For an account of a lately invented Cokeing furnace, see *Rep. Arts*, vol. xiv.]

COLD, in natural philosophy, is the privation, or absence of heat. Its immediate effects on the human body are, contraction of the cutaneous pores, and a temporary obstruction of insensible perspiration. Hence we perceive what is vulgarly called the "goose skin," and the parts thus affected will not recover their usual elasticity, till the spasm be removed, either by external or internal heat, or by friction, which excites the latter. At present, we shall only treat of the consequences resulting from an *excess of cold*; having already considered part of this subject under the article Catarrh.

Beneficent Nature has enabled our frail and complicated frame, to support the heat and cold of different climates, with equal facility; and though man has devised artificial means of defending his body against the action of cold, or more properly, of retaining the *inbred*, or vital heat, yet it often happens that, by exposure to extreme cold, the fingers, ears, toes, &c. are *frozen*: thus, the natural heat of those parts is reduced to the lowest point consistent with life. If, in such cases, artificial heat be too suddenly applied, a mortification will ensue, and the *frost-bitten* parts spontaneously separate. Hence they ought to be thawed, either by rubbing them with snow, or immersing them in cold water, and afterwards applying warmth in the most careful and gradual manner; by which they will soon be restored to their usual tone and activity. Indeed (a popular writer justly observes), the great secret, or art, of restoring suspended animation, consists in nicely adjusting the natural and artificial stimuli to the exact tone of the irritable fibre.

As moderate cold produces at first debilitating, and eventually bracing effects on the animal body, it is the most beneficial temperature in the cure of febrile, and such diseases as are not attended with extreme debility; but it should never be followed by any considerable degree of heat. SYDENHAM, more than a century ago, pointed out the evils attendant on too much heat in sick-rooms; he seldom would allow his patients even to lie in bed, and very judiciously directed the rooms to be constantly ventilated with cool air. The great benefit derived from this practice in the small-pox, is now generally acknowledged, and arises chiefly from avoiding the stimulus of heat, after its operation.

The great cold produced by *evaporation*, observes Dr. DARWIN, is now well understood. In all chemical processes, where aerial, or fluid bodies become consolidated part of the *latent heat* is pressed out, as in the instant when water freezes, or unites with quick-lime. On the contrary, when solid bodies become fluid, or fluid ones become aerial, heat is absorbed by the solution: whence it may be said, in general, that all chemical combinations produce heat, and all chemical solutions generate cold. This should teach the careful gardener, not to water tender vegetables in the heat of sun-shine, or in a warm dry wind, lest the hasty evaporation should produce so much cold as to destroy them; an effect that will the more certainly follow, as they have been previously too much stimulated by heat, in consequence of which, the power of life, or irritability, had been already diminished.

When treating on the diseases of plants, Dr. DARWIN remarks, that though excessive heat is seldom very injurious to vegetation in this country, yet the defect of that element, or in common language, excess of cold, is frequently destructive to the tender shoots of the ash, and the early blossoms of many fruit-trees, such as apples, pears, apricots, &c. The *blights* occasioned by frost, generally happen in the spring, when warm sunny days are succeeded by cold nights, as the living power of the plant has then been previously exhausted by the stimulus of heat, and is therefore less capable of being excited into the actions necessary to vegetable life, by the greatly diminished stimulus of a freezing at-

mosphere.

In the northern climates of Sweden and Russia, where long sunny days succeed the melting of copious snows, the gardeners are obliged to shelter their wall-trees from the meridian sun, in the vernal months; an useful precaution, which preserves them from the violent effects of cold in the succeeding night; and, by preventing them from flowering too early, avoids the danger of the vernal frosts. In a similar manner, the destruction of the more succulent parts of vegetables, such as their early shoots, especially when exposed to frosty nights, can only be counteracted by covering them from the descending dews, or rime, by the coping stones of a wall, or mats of straw.

Having given a short account of the sensible effect of a cold temperature on animal and vegetable life, we shall conclude with a few remarks connected with the *natural history* of this elementary power. The properties of *cold* seem to be directly opposite to those of *heat:* the latter increases the bulk of all bodies; the former contracts them; and, while fire tends to dissipate their substance, cold condenses them, and strengthens their mutual cohesion. But though cold thus appears, by some of its effects, to be nothing more than the absence or privation of heat, as darkness is only the defect of light, yet cold is probably possessed of another quality, which has induced many to consider it as a substance of a peculiar nature. It is well known, that when a continuance of cold has contracted and condensed bodies to a certain degree, if then its power be increased, instead of progressively lessening their bulk, it enlarges and expands them, so that extreme cold, like heat, swells the substance into which it enters....... Thus fluids sensibly contract in a cold temperature, till the moment they begin to freeze, when they immediately dilate, and occupy more space than they possessed while in a state of fluidity. Hence, liquor frozen to ice in a close cask, is often known to burst the vessel: when ice is broke on a pond, it swims upon the surface; a certain proof of its being lighter, or of a larger bulk, than an equal quantity of water. This dilatation of fluids, however, is probably owing to a cause very different from that of excessive cold alone; because the power of freezing may be artificially increased, while the intenseness of the cold receives no considerable addition; and, on the contrary, a substance capable of melting ice, will increase the degree of its coldness. Thus, for instance, sal ammoniac mixed with pounded ice, or with snow, melts either of them into water; and increases their cold to a surprizing degree, as is obvious from the effects of this mixture, in sinking the thermometer. Hence the freezing of fluids cannot be entirely considered as the result of cold, but of some unknown property either in the air or water, which thus mixes with the body, and for a time destroys its fluidity. We cannot, in this place, enter into farther particulars relative to this curious subject; but as there have lately been invented several methods of converting water into ice, which may be of service in domestic economy, we shall communicate the most easy and least expensive processes of this kind, under the article Ice.

[An intense degree of cold was produced by W. H. Pepys, junior, of London, and also by Mr. Walker

of Oxford, by employing SEGUIN's frigorific mixture of *muriate of lime* and snow. Mercury was fixed, by immersing in the mixture a glass retort containing the mineral. See an interesting account of the whole experiment of Mr. P. in *Tilloch's Phil. Mag.* vol iii. p. 76. and a notice of that by Mr. WALKER, p. 110.]

COLIC, a disease attended with wandering pain in the bowels, and rumbling noise; both abating on the expulsion of wind: there is a slight degree of thirst; the pulse is scarcely affected, and the pain is not increased by pressure, as is the case in inflammations.

This complaint may arise from a great variety of causes; the principal of which are, 1. Flatulency; 2. Tough, pituitous humours, clogging the intestines; 3. Worms; 4. Bile; 5. The Piles; 6. Hysterics; 7. Acrid food or drink; 8. The inhalation of vapours arising from the decomposition of lead; 9. Rheumatism; 10. The use of sour wines and cyder; 11. The gout; 12. A sudden catarrh; 13. An acid generated in the first passages; 14. Obstructions in the intestinal canal; and, 15. Poisonous substances introduced into the stomach.

Consistently with our plan, we shall but briefly treat, here, of those colics which originate from the 2d, 7th, 10th, and 13th of the causes before enumerated; as the reader will find the other species discussed under their respective heads of the alphabet; and the last, or 15th, under the articles ANTIDOTES and ARSENIC, in our first volume.

If the colic proceed from the *second* cause, it is attended with frequent evacuations of viscid and glossy humours which produce only occasional relief from pain. Camphor and rhubarb ought to be taken in small doses, namely, one grain of the former, and two grains of the latter, every three hours, or oftener; and after the spasms have subsided, an infusion of *catechu* (which see) or solutions of *alum*, will be found the most effectual remedies.

When acrid food, or tart and corrupt beverage, has occasioned the complaint, it will first be necessary to take a gentle emetic, or if some time has elapsed, to open the bowels, by the mildest laxatives, such as castor-oil, a solution of manna, with a few grains of rhubarb, &c.

Colics arising from the use of sour wines and cyder, are generally attended with excruciating pain, and paralytic symptoms. The most proper remedies in such cases are, the tepid bath; emollient fomentations made of chamomile flowers, with the addition of laudanum, applied to the abdomen; all such remedies as promote perspiration, and especially the volatile tincture of guaiacum. But the safest, and perhaps most effectual means of procuring relief from pain, are *antispasmodic clysters*: they should be prepared of a weak decoction of ipecacuanha; for instance, one dram boiled in three-quarters of a pint of water, till the third part be evaporated, adding to every clyster from 30 to 40 drops of laudanum; and repeating the injection every six or eight hours, at a temperature of about 90°.

A similar treatment may be adopted in those colics, which frequently attack persons who have a peculiar tendency to generate an acid in their stomach and bowels: but as this acidity is generally the consequence of obstipations, or ob-

structions of the abdomen, these ought to be previously removed by the use of *laxative* CLYSTERS (which see), assisted by gentle aperients taken by the mouth, for instance, calcined magnesia and rhubarb, in doses of one scruple of the former, and three grains of the latter, repeated every four or six hours.

Lastly, we think it our duty to caution the reader against the use of heating, stimulating, or spirituous remedies, in every kind of colic, except that arising *solely* from flatulency, without any other predisposing cause: as, however, no ordinary observer will be able to ascertain whether the expulsion of wind, which generally accompanies this complaint, be its generating cause, or only a concomitant symptom, we seriously recommend, in such a state of uncertainty, to abstain from all violent remedies; to apply no other but emollient clysters and fomentations; and to drink large portions of lilac-flower or chamomile tea, or take any other diluent beverage, till the spasms be relieved, and the nature of the disease more clearly understood..... These remedies are not fraught with danger; and, if properly persisted in, have frequently been attended with the most desirable effects. For treating the colic of infants, see BILE, vol. 1.

[In common cases of colic, relief is soon obtained by opening the bowels, either by glauber salts, mixed with cream of tartar, and dissolved in hot lemonade; by castor-oil, or, by purging clysters, and by afterwards giving laudanum in small doses every half hour. But in some violent cases, a most obstinate costiveness prevails, attended by alarming vomiting. In this case, the clysters must be repeated every half hour, *some blood* taken away, and *cold water dashed on the feet*. After the bowels have been well opened, opium in small doses may be given. In some instances the *warm bath* has produced immediate relief. Many persons are subject to frequent returns of this painful disease, which, very probably, proceeds from gall-stones. Dr. G. of New-Jersey, uses a decoction of the root of the common mulberry tree to prevent the disease, with great success. Some well attested instances of the success of this remedy, have been communicated to the editor.

Horses are frequently affected by *colics*, in consequence of violent exercise, or of the animal being permitted to eat too much green herbage, or of bad hay, new oats, or Indian-cornblades. The symptoms, according to RYDING, are great restlessness, frequent attempts to lie down; the hind extremities are drawn under the body; and the horse rolls frequently. Two or three quarts of blood must be taken away, and the operation may be repeated, if required; but above all, clysters ought to be injected, composed of the following ingredients: water, half a gallon; salt, one handful; oil of any kind, one pint; molasses, one pint; *mix*. This quantity must be injected by a large pewter syringe, every half hour, until the bowels are well opened. If the pain be not removed, a pint of sweet-oil or castor-oil, may be poured down the throat, in order to open the whole intestinal canal; after which, clysters of linseed decoction, with the addition of a table-spoonful of laudanum, may be injected every hour until ease be procured. A table-spoonful of laudanum may also be poured down the throat, and the horse kept warm.]

[COLLINSONIA, *Canadensis*, Nettle leaved Collinsonia, horse-weed, knatt-root, knot-wood.

Two plants belong to this genus. 1. The above mentioned, and 2. *C. Scabriuscula*, or rough-stalked Collinsonia, found by the late John Bartram, in East Florida. The *C. Canadensis*, has a perennial root, and usually rises four feet :. the stalks decay in the autumn : they are square, leaves heart-shaped, opposite and sonate. The flowers are produced at the extremity of the stalks in loose spikes, are of a purplish yellow, and appear early in July. The root is composed of woody knots, which are extremely hard; and when broken and infused in cyder have cured several alarming cases of dropsy, an account of which has been communicated to the editor. The remedy ought to be tried infused in warm water.]

COLOPHONY, a black resin, or turpentine boiled in water, and afterwards dried. It is chiefly used in the composition of horse-medicines.

Coloquintida. See Cucumber.

COLOUR is one of the most remarkable phenomena in nature, the explanation of which, by the ancient philosophers, was vague and unsatisfactory, till Sir Isaac Newton, in 1666, discovered that the coloured image of the sun, formed by a glass prism, was not of a circular, but of an oblong form, contrary to the laws of refraction. Hence he conjectured, that light is not *homogeneal*, or a simple body, but that it consists of rays, some of which are much more refrangible than others. This theory was very generally received, and subsequently improved upon by Dr. Hooke, as well as by other native and foreign philosophers; and, though the doctrine of colours is far from being determined with sufficient precision, yet we are warranted to admit the truth of the following propositions:

1. All the colours in nature proceed from the rays of light.

2. There are seven primary colours; namely, red, orange, yellow, green, blue, purple, and violet or indigo.

3. Every ray of light may be separated into the seven primary colours.

4. The rays of light in passing through the same medium, have different degrees of refrangibility.

5. The variation in the colours of light arises from its different refrangibility; that which is the least refrangible producing red; and that which is the most refrangible, violet.

6. By compounding any two of the primary colours, as red and yellow, or yellow and blue, the intermediate colour, as orange or green, may be produced.

7. The colours of bodies arise from their dispositions to reflect one sort of rays, and to absorb the other.

8. Such bodies as reflect two or more sorts of rays, appear of various colours.

9. The whiteness of bodies arises from their disposition to reflect all the rays of light promiscuously.

10. The blackness of bodies proceeds from their incapacity to reflect any of the rays of light. Hence it is, that a black body, when exposed to the sun, becomes heated much sooner than any other.

Although, of all sensible qualities, colour is the least useful in ascertaining the virtues and powers of vegetables; yet, as the follow-

ing general positions have been laid down on this subject, by LINNÆUS, and as they appear to be sufficiently attested by experience, we shall conclude this article with specifying them.....A *yellow* colour generally indicates a bitter taste, as in gentian, aloe, celandine, turmeric, and other yellow flowers. *Red* denotes an acid or sour taste; as in cranberries, barberries, currants, raspberries, mulberries, cherries, the fruit of the rose, sea-buckthorn, and service-tree. Herbs that turn red towards autumn, have also an acid taste; as sorrel, wood-sorrel and bloody dock. *Green* indicates a crude, alkaline taste, as in leaves and unripe fruits. A *pale* colour denotes an insipid flavour, as in endive, asparagus, and lettuce. *White* promises to be sweet and luscious to the palate; as in white currants, and plums, sweet-apples, &c. Lastly, *black* indicates a harsh, nauseous, and disagreeable taste; as in the berries of deadly night-shade, myrtle-leaved sumach, herb-christopher, and others; many of which are not only unpleasant to the taste, but pernicious and fatal in their effects.

COLOUR-MAKING, is the art of preparing various colours employed in painting. This art, tho' one of the most curious branches of chemistry, is the least understood. The principles that govern it, differ totally from those, on which the theory of other parts of chemistry is founded; and as the practical part is in the hands of persons who sedulously conceal their methods of preparing colours, we have only a superficial theory, and are but imperfectly acquainted with the practice.

Colours are divided into various classes, such as opaque and transparent; oil and water-colours; simple and compound; true and false.

I. *Opaque colours* are those which, when laid on any substance, efface every other painting or stain; such as white and red-lead, vermillion, &c. *Transparent* colours possess the peculiar property of leaving the ground, on which they are laid, visible through them. These are employed for illuminating maps, charts, &c.

II. *Oil* and *water-colours* are thus denominated, from their being appropriated to painting in oil and in water.

In preparing oil-colours, care must be taken to grind them extremely fine; and, when they are put on the pallet, to mix those which will not dry of themselves, with drying oils; and also to mix the tinged colours in as small quantities as possible. With respect to the application of them, if employed for large pieces, they should be laid on full, in order that they may incorporate, and more firmly adhere. If they are intended to be *glazed*, particular care must be taken to paint the under-colour strong and smooth; after which the others may be gradually added, till the whole is properly filled up. Oil-colours are, however, sometimes worked dry, where only one is used, as in *cameos*, in which the gradations of colours of distant objects are usually managed by lights, as with crayons; and in *basso relievos*, which are imitations of sculpture, of every kind and colour.

Water-colours are wrought in various modes; namely, in *distemper* (as artists express it), where the colours are prepared in size; in *fresco* or painting on fresh mortar, in which case it is requisite that the *colouring* be quick, lest

the stucco or mortar dry, before it can be laid on; and that it be neatly and carefully executed; each colour being properly placed, and occasionally intermingled by parcels; in *agouache*, where the colours are mixed with gum, and the pencil drawn along, as in paint and washings; and lastly, in *miniature*, for small and delicate works, in which the colours are required to be very fine and clean, to be mixed with gum, and worked in dots or points.

III. *Simple and compound colours.* The former are perfect in themselves, such as red and white lead, vermillion, the calces of iron, &c.; the latter are formed by the union of two or more colouring substances; for instance, blue and yellow, when blended together, make a green; red and yellow, an orange; and white earth and cochineal, a lake, &c.

IV. The last and most important division of colours, is into *true* and *false*: the former retain their pristine tinge, without fading, under every possible variety of circumstances; the latter either lose their colour entirely, or change into some other shade.

Colours are chiefly affected by being exposed to the sun during the summer, and to the cold air in winter. White lead, however, forms an exception; as, when ground with oil, it retains its whiteness, if it be exposed to the weather, but degenerates into a brownish or yellowish cast, in a confined situation. Nevertheless, when it is immersed in water, it is totally divested of its colour, whether it be exposed to the effects of the air or not. In the making of colours, the chief object is, that they may not fade, from the influence of the weather; though it must be regretted that the most beautiful are, in general, the least permanent. It may, however, for the most part be assumed, that the more simple any colour is, the less liable it will be to change by exposure to the air.

Having thus briefly stated the general theory of colours, we shall also give some account of the different pigments, which are most commonly employed by colour-makers.

1. Black, consists of several sorts, such as lamp-black, ivory-black, blue-black, and Indian ink. The first of these is the finest of what are called soot-blacks, and is more used than any other. Its preparation depends on the manufacture of common resin. The impure juice collected from incisions made in pine, and fir-trees, is boiled down with a small quantity of water, and strained, while hot, through a bag; the dregs and pieces of bark remaining in the strainer, are burnt in a low oven, whence the smoke is conveyed through a long passage into a square chamber, at the top of which is an opening, with a large sack affixed, made of thin woollen stuff: the soot, or lamp-black, concretes partly in the chamber, whence it is swept out once in two or three days, and partly in the sack, which is occasionally agitated, in order to take down the soot, and to clear the interstices between the threads, so as to admit a free current of air. This method of preparing lamp-black, was originally invented in Sweden, but has also been introduced into this country; and is now carried on to a considerable extent in the turpentine-houses, from the refuse of resinous matters.

Ivory-black is prepared from ivory, or bones, burnt in a close vessel; and, when finely ground, affords a deeper and more beautiful colour than lamp-black; but it is, in general, so much adulterated with charcoal, and so grossly levigated, as to be unfit for use. An opaque deep black, for water-colours, may be prepared, by grinding ivory-black with gum water; or with the aqueous liquid that settles from the whites of eggs, which have stood some time to subside.

German Black, see *Frankfort Blacking*, vol i.

Blue-black is said to be prepared from the burnt stalks and tendrils of vines. This is, however, seldom done by colour-makers, who generally substitute a mixture of ivory-black, and the common blue used for dyeing cloths.

Indian-ink is an excellent black for water-colours, and may be thus imitated. [Boil an ounce of fine lamp-black in a little water, in an earthen vessel, taking care to skim it. Add a dram (60 grs.) of gum arabac (or cherry-tree gum), and evaporate till the mass has acquired consistence enough to be made into tablets.]

2. White, of which there are several kinds; as flake-white, white-lead, calcined hartshorn, pearl-white, Spanish-white, egg-shell-white, and magistery of bismuth.

Flake-white and *white-lead*, are the produce of the same metal.

[Flake-white is a purer kind of white-lead, washed and ground over again. White-lead is thus made: Rolled or milled lead is twisted up in a spiral form, and placed on end, on wooden crosses in earthen vessels. Vinegar is put in the vessels up to the cross. The vessels are then put into a bed of horse-dung, the tops being closely covered with a flat plate of lead. The heat of the dung raises the vinegar in steam, and corrodes the plates..... The white-lead is scraped off, and ground in a mill, and well washed. In lieu of horse-dung, larger vessels may be used, and a gentle fire. The vinegar may be evaporated after some time for sugar of lead. White lead is adulterated with whiting or tobacco-pipe clay. Spirit of salt will dissolve the whiting: or take an oz. of pure white-lead, and flux it with charcoal, and an oz. of suspected white-lead, and do the same; the different quantities of metal obtained will shew the amount of the adulterations. For substitutes for white paint see article "Painting."]

(See White-Lead.) These two are the only whites that can be used in oil; all the rest being transparent, unless laid on with water.

Calcined hartshorn is the most useful of the earthy whites, as it contains the least proportion of alkali.

Spanish-white is only chalk, very finely prepared.

Pearl-white is made from oyster-shells, as *egg-shell-white* also is from those of eggs. All these, from their attraction for acids, necessarily destroy those colours which are compounded with any acid or metallic salt.

The *magistery of bismuth* is apt to turn black, as well as flake-white, and white-lead, when employed for a water-colour.

3. Red. The principal red colours used in painting, are carmine, rose-pink, vermillion, and red-lead.

Carmine is the brightest and most beautiful red colour known at present.

[This is prepared from cochineal. Into a very clean tin pot with a cover, pour 10 or 12 quarts of pure water; let it simmer but not boil: put in an ounce of finely powdered and sifted cochineal, and let all boil gently for five minutes...... then add 30 grs. of finely powdered Roman alum, and boil again twenty minutes, remove the pot from the fire, and stand covered till it cools. Drain off the water when cool, gently, and the sediment that falls from it, will be the finest carmine. This will happen in 48 hours. Pour off the water, and if coloured, let it settle again in another dish. The grosser sediment is *red lake*. The finer sediment is carmine when collected and dried. The sediment may be again boiled and left to settle...... N. B. In my opinion a few drops of diluted solution of tin in spirit of salt added to the solution of the cochineal, (or any other colouring matter) will produce a much finer lake, T. C. In the same way may be made lakes from Brazil wood, and madder, and kermes berries. For another receipt, see article "CARMINE."

Rose-pink is a very delicate colour, inclining more to purple than scarlet. It is prepared from chalk, coloured with a decoction of brasilwood, heightened by an alkaline salt, which renders it very liable to fade, and of little value. This colour might be made more durable, by employing for its basis the white precipitate of lead; and by brightening it with a solution of tin.

Vermillion consists of sulphur and quicksilver, the former of which is melted, when the quicksilver is stirred in, and the whole is converted into a black mass. See CINNABAR, vol. 1.

[If Vermillion be adulterated with red-lead, it may be discovered by fluxing it with charcoal in a crucible; the vermillion will evaporate, and the lead be reduced.]

Red-lead is a calx, of a lively yellowish colour, which it acquires by slow calcination. Both these colours are very durable; the former, however, is the best red for oil-painting, but does not answer with water; the latter inclines to an orange; and, like other preparations of lead, frequently turns black.

[*Venetian-red* is a native red *ochre*, but imitated by colcothar, or the residuum of green vitriol after the old method of procuring oil of vitriol by distilling nitre with green vitriol.]

4. ORANGE. The genuine orange-coloured paints are, *red orpiment*, and *orange-lake*: the first of these is a sublimate formed of arsenic and sulphur; the other may be prepared from turmeric, infused in spirit of wine, having its colour struck upon calx of tin, and brightened by a solution of that metal. The different shades of orange may, however, be prepared by mixing red and yellow colours together in due proportions.

5. YELLOW. The chief colours of this kind are, Kings and Naples-yellow, Dutch-pink, and Turbith-mineral.

Kings-yellow is prepared from arsenic. Its colour is very beautiful, but apt to fade, on which account, as well as from its great price, it is but seldom employed.

[*Naples-yellow*. This is a natural production found near Naples, consisting of a kind of lava, unchangeable by fire and by acids. The ar-

tificial kind is thus made. Mix 12 ounces of white-lead, 2 ounces of diaphoretic antimony (the washed calx of antimony), $\frac{1}{2}$ an oz. of calcined alum, and 1 oz. of pure sal ammoniac, pound them well together, put them in an earthen crucible, with a cover, calcine them in a slow fire, so that the crucible shall not be hotter than a dark red heat, continue this for three hours. If a bright golden colour be wanted, add $\frac{1}{2}$ oz. more of antimony, and a $\frac{1}{4}$ oz. of sal ammoniac. Do not let iron touch this colour.

Those who may wish to inform themselves more particularly concerning Naples-yellow, and the different methods of preparing it, are referred to the translation of a paper by Prof. BECKMAN, inserted in *Tilloch's Phil. Mag.* vol. 3d.]

[*Turner's Patent mineral yellow.* According to our late celebrated townsman and friend, Dr. JOHN PENNINGTON. See *Chemical Essays*, Philadelphia, 1790.

Take 2 oz. spirits of sea salt (marine acid), made according to the process laid down in the "Edinb. Dispensatory," and one pound of litharge, mix and put them in an iron mortar holding about a pint, and lined with a mixture of four parts sand and one of clay mixed up with water. Heat the mortar *white* in a furnace. Never stir the ingredients while in fusion, and beware of iron through the whole process. When the mixture is fused, it is to be poured out into proper moulds made of clay, and when cold, the process is entirely finished.]

Turbith-mineral is, at present, but little used in painting, though it appears to be very durable, and is therefore preferable both to Kings and Naples-yellow.

[*Dutch-pink.* Boil $\frac{1}{4}$ lb. of turmeric berries in one gallon of water, and add whiting to the clear liquor: the colour will unite to the whiting which should be collected and dried.]

6. GREEN. The only simple green of a tolerable degree of brightness, is *verdigrease*, or its different preparations: though far from being durable, it may be rendered more so, as a water-colour, by dissolving it in the pure tartarous acid. A green colour may be made by compounding Prussian or other blue, with yellow; but it is by no means fixed, and much inferior to common verdigrease.

[*Brunswick-green.* This is a German colour, not used in England. It is said to be a *tartarised copper* made thus: Dissolve one part by weight of sal ammoniac in water: lay in it three parts by weight of copper plates; when a green rust forms, wash it off, and repeat this till the copper is entirely corroded. Twelve parts of copper give 17 parts of common B. green, which is precipitated by boiling it with tartar.

[*Scheeles-green.* This excellent colour was discovered by the Swedish chemist Scheeles, and is made thus. Dissolve 2 lbs. blue vitriol in about three gallons of boiling water in a vessel capable of holding at least four gallons more. In another vessel boil together 2 lbs. of pearl ash, and $\frac{3}{4}$ of a pound of *white arsenic*, in about 2 $\frac{1}{2}$ gallons of water; boil it till the arsenic is dissolved, or nearly so; then pour this last hot solution into the first while hot, it will effervesce a good deal, and, therefore, the vessel should be large. The precipitate will be a finer powder, in proportion to the quantity of water used. Wash and dry it. The produce will be about

$\frac{1}{4}$ of colour. *Common green colour* may be made by precipitating solutions of copper by whiting and potash.

[*Sap-green*, is the inspissated juice of Buckthorn berries obtained by expression.

To make a water colour from verdigrease, pound four ounces of ver. with 2 oz. of white tartar, and boil them in a half pint of water, taking care that none runs over: stir it often. Evaporate to a consistence, then pour it into a muscle shell to evaporate to dryness.]

7. Blue. The principal blue colours are, Prussian and Dutch Blue, Verditer, Smalt, Bice, and Indigo.

Various processes have been adopted for the making of *Prussian-blue*, of which we shall select the shortest.

Take 3 lbs. of dried ox's blood, 4 lbs. 8 oz. of quick-lime, 2 lbs. of red tartar, and 1 lb. 8 oz. of saltpetre. Let them be calcined and lixiviated, when the ley should be poured into a solution of 4 lbs. of alum, and 1 lb. of green vitriol. This operation will produce the finest blue; but the quantity will exceed little more than 8 oz. and 4 drams.

[*Prussian-blue*. The following process was recommended by Dr. John Pennington. Mix six lbs. of powdered black bones, with one pound of potash: press these ingredients closely into an iron pot, and cover it with an iron cover, well plastered with clay or earth. Expose the pot to a *bright red heat*, for three or four hours. When cool, take the ingredients out, dissolve the soluble parts in hot water, and strain through flannel. If the blue be wished of the very first quality, pour into the liquor, either *spirit of salt*, or oil of vitriol, until the boiling ceases on any fresh addition of the spirit. Pour the whole into a solution of half a pound of *green vitriol* in two gallons of water. If a lighter blue be wished, add a less quantity of the spirit of salt, or oil of vitriol, to the liquor from the bones, in which case add a quarter of a pound of alum to the solution of green vitriol: then mix a little of the two liquors in a phial, and if the colour be too light, add more of the spirit: mix the whole together as before. In the instant of mixing, the two liquors, which were before colourless and transparent, become of an opaque blue; in a few hours the blue fecula subsides, and leaves a transparent liquor on the top, which may be thrown away: the sediment must be stirred up with clean hot water, and suffered again to subside: this must be repeated seven or eight times, and then the fluid filtered through paper, and dried on a large cake of chalk.

The artist will find some valuable hints respecting this and other chemical manufactures in Dr. Pennington's Essay, Phil. 1790.

Blue-verditer; add lime well burnt, fallen and sifted, to a solution of blue vitriol. It is also made from the nitrated solution of copper left by refiners of silver after the operation of parting, or separating the silver by means of salt, from the nitrous solution. To this solution of copper, whiting or chalk is added.

Earths coloured blue by iron ore are often found native.

For the above important additional articles on colours, the editor is indebted to Thos. Cooper, Esq. of Northumberland.]

Dutch-blue. See Blue, vol. i. p. 321.

The preparation of *verditer* is

studiously concealed, so that the best chemists of Europe have been baffled in discovering its component parts. It is very bright, and has a considerable tinge of green. This colour is durable in water; but, like verdigrease, dissolves in oil, and is subject to the same inconveniences.

Smalt is glass coloured with zaffre; a preparation from [the calx of] cobalt. It is, in general, so grossly pulverized as to be unfit for painting, and its texture is so hard, that it cannot easily be levigated. Its colour is exceedingly bright and durable; and, if finely pulverized, is little inferior to Prussian-blue.

Bice is prepared from the *Lapis Armenus*, a stone which was formerly brought from Armenia, but now from Germany. Bice bears the best body of all bright blues in common use, but it is the palest in colour. Being somewhat sandy, it is necessary to grind it very fine, and to wash it well, previously to its being used. It is as durable, and yields nearly as good a colour as Prussian-blue.

Indigo is but little employed in painting either in oil, or water, on account of the dullness of the colour. It requires no other preparation than that of being washed over, before it is used. See INDIGO.

8. PURPLE. The only simple colour of this kind at present, is colcothar of vitriol, or *crocus martis*. A beautiful purple lake may be prepared from logwood, by means of a solution of tin. As this mode of preparing colours is but little known, we shall give a few hints respecting it, under the subjoined head of COLOURING MATTER.

9. BROWN. The chief Brown colours are bistre, and brown Pink.

Bistre is prepared from the most glossy, and perfectly burnt soot, [chiefly of beech wood] pulverized, passed through a fine sieve: [and boiled in water for half an hour in the proportion of 2lbs. to a gallon of water. After settling, it is poured off, dried] and then baked in a little gum-water, and formed into cakes. This is a very useful colour in water, being exceedingly fine and durable, and not apt to spoil any other colours with which it is mixed. The *brown-pink* is said to consist of chalk, tinged with the colouring matter of fustic, heightened by fixed alkaline salts. It is, consequently, very perishable, and seldom used.....See also CHAFER.

COLOURING MATTER is contained in almost every flower and root of vegetables, and may be extracted by a very simple process. The Dutch prepare pigments of the most beautiful shades, for instance, a very fine azure blue, from the blossoms of the corn blue-bottle, *Centaurea Cyanus*, L......a delicate red, from the fresh leaves of roses, especially the small French rose; ....an excellent violet from the flowers of that name, &c. in the following manner: Take the roots, leaves, or flowers of whatever quantity is desired, bruise them nearly to a pulp, put them into a glazed earthen vessel, pour a sufficient quantity of filtred water over them, and add a table spoonful of a strong solution of pure pot-ash to every pint of the former. Boil the whole over a moderate fire, till the liquor is evidently saturated with the colour afforded by the vegetable; than decant the fluid part, either through blotting paper, or cloth, and gradually drop into it a solu-

tion of alum, when the colouring matter will subside at the bottom. This powder should again be washed in several fresh waters, till they pass away perfectly tasteless: at length, it must be once more filtred through paper, and the remaining substance perfectly dried. From this preparation are afterwards manufactured the finest pigments, or water-colours, of the shops, by triturating them on marble stones, with the addition of a little clarified gum-water, and then forming them into cones, cakes, &c.

Having already, under the different heads of plants, mentioned the various purposes to which they may be usefully applied, in the arts of colouring, dyeing, tanning, &c. it would be superfluous to enumerate them on this occasion....a task we are necessarily obliged to defer, on account of the great variety of vegetables which will occur in the sequel of the alphabet. To enable, however, those readers who are engaged in any particular art, or trade, to take a comprehensive view of every useful fact connected with their respective pursuits, we take this opportunity of informing them, that we intend to give a copious and universal *Index of Reference*, at the conclusion of our labours. By the assistance of such an index, they will be enabled immediately to avail themselves of all the modern improvements, discoveries, and inventions, relative to any subject treated of in the *Domestic Encyclopædia*; whether it be recorded under a distinct head of the alphabet, or only incidentally mentioned.

COLT, the young of a mare, usually called a *horse-colt*, in order to distinguish it from the female, which is denominated a *filly*.

Colts should always be bred from a sound stud, as their future utility, in a great measure, depends on that circumstance; and also on the manner in which they are reared. In the first summer, they may be permitted to run with the mare till Michaelmas, or longer, if the weather continue mild. They should then be weaned, and kept in a stable, with a low rack and manger for their hay and oats; but the latter should be crushed in a mill, before they are given to them, as this necessary precaution will prevent the distension of their lower jaw-veins; which would otherwise attract the blood and humours down into the eyes, and occasion loss of sight. We would particularly recommend a strict attention to this circumstance; as the blindness we frequently observe in colts, is not to be attributed to the heating nature of the oats, but solely to the difficulty with which they are chewed.

The feeding of colts with grain is attended with another advantage, namely, that their legs do not become thick and ill-shaped, while they on the whole grow broader, and better knit, than if they were fed only with bran and hay; aud will also be more able to endure fatigue.

Colts should be carefully kept from wet and cold; as they are extremely tender, and would be greatly injured by either. During fine weather, however, they may be allowed to pass an hour or two in the open air, when they should be conducted to the stable. By this treatment, they will acquire a habit of docility; and, when broken in, will bear the saddle quietly; which operation should not be undertaken till they are at least three years of age.

These young animals are subject

to various disorders, the most fatal of which is a cough, that generally attacks them when they are about six months old, and is accompanied with a visible decay, arising from certain pellicles, or skins frequently separated from their interior organs, which obstruct their breathing, and at length destroy them. To remedy this distemper, sweet cow's-milk, in which a little mutton suet has been dissolved, or the beestings alone, would be found beneficial. [See HORSE.]

COLTS-FOOT, or *Tussilago*, L. a genus of plants forming 21 species, of which only three are natives:

1. The *Farfara*, or common colts-foot, which grows in pastures, in moist, stiff, clayey soils, and also on lime-stone rubbish. It is mostly found in fields that are over-cropped, or exhausted, and often severely exercises the patience of the farmer. It may be eradicated by ploughing up the soil, carrying the plant away when rooted out, and laying the fields down to grass. Hog's dung has also been employed with success for this purpose; and, if spread on the land in the proportion of 15 or 20 loads per acre, it will certainly extirpate this troublesome weed. Colts-foot produces yellow flowers that are in bloom in the month of March or April, and are soon succeeded by large roundish leaves, which have a bitterish, mucilaginous taste, and constitute the principal ingredient in British herb-tobacco. They are eaten by sheep, goats, and cows, but refused by horses and hogs. Formerly they were much used in coughs and consumptive cases; and have also been found of considerable service in scrophulous complaints; a decoction of these leaves having sometimes succeeded, where sea-water had failed.

2. The *Petasites*. See BUTTER-BURR.

3. The *Hybrida*, or long-stalked colts-foot, which possesses no peculiar properties.

COLUMBINE, the Common, or *Aquilegia vulgaris*, L. is a native plant, growing in hilly woods and thickets. It is perennial, and blooms in July. The beauty of its flowers, and their uncommon diversity, both in shape and colour, have introduced this plant into gardens. It is eaten by goats, but sheep are not fond of it, nor is it relished by cows, horses, and hogs.

COLUMBO-ROOT, or COLOMBA-ROOT, an article lately introduced into medicine, chiefly by Dr. PERCIVAL. The natural history of the tree, from which we obtain it, is but imperfectly known: it grows near the town of Columbo, in the island of Ceylon. The most active part of the root is its bark, which is imported in circular pieces, consisting of a cortical, woody, and medullary lamina, and having a rough surface. It has an aromatic odour, but a disagreeably bitter, and somewhat pungent taste. It is possessed of antiseptic properties, has been found efficacious in correcting and preventing the acrimony of bile.

The Columbo-root is much used abroad in diseases attended with bilious symptoms, and in an impaired state of digestion. It has a remarkable tendency to restrain the fermentation of alimentary matter, without affecting the stomach; a property in which it resembles mustard. Nor is it attended with any heating effect, and may therefore be advantageously taken in pulmonary consumption, and other

hectical cases, both with a view to correct acrimony, and strengthen the digestive organs. Farther, it does not rise on the stomach, and agrees well with a milk-diet, as it abates flatulence, and is totally divested of acidity. Hence, we regret that this valuable drug is not regularly imported; and that it is frequently found either in a very decayed, or adulterated state....... The common dose is from ten to fifteen grains, every three or four hours, for adults; and from two to six grains, for children.

COMB, an instrument made of horn, ivory, or other materials, and used for separating, cleaning, and dressing flax, wool, hair, &c. Combs for wool are prohibited to be imported into England.

A very useful *Comb-pot* was invented, a few years since, by JOHN ASHMAN, an ingenious person employed by Messrs. DANIEL and THOMAS DYKE, of Sarum. It consists of an almost cylindrical furnace for water, which contains a smaller one, keeping the suds of the second washing of the wool, to be used with the next quantity of wool, the first way. The whole being a manufacturing process, we refer the reader to the "*Letters and Papers of the Bath and West of England Society*;" or to the 7th vol. of the "*Repertory of the Arts and Manufactures*," where he will find it described, together with an illustrative engraving.

In June, 1796, a patent was granted to Mr. WILLIAM BUNDY, of Camden-town, Middlesex, for a machine for cutting and making combs; a full description of which, together with a plate, is inserted in the 11th vol. of the last mentioned work.

COMBINATION. See ARTIFICER.

COMFREY, the COMMON, or *Symphytum officinale*, L. a native, perennial plant, which grows about two feet high, is found on the banks of rivers, and wet ditches; and produces yellow-white flowers, in the months of May and June. It is eaten by sheep and cows, but horses, goats, and hogs refuse it. The leaves of this plant impart a grateful flavour to cakes and panada; the young stems, when boiled, are excellent and nutritious eating. A decoction of the stalks, with leaves and flowers, gives to wool prepared by a solution of bismuth, a fine and permanent brown colour.

But the most useful part of the Comfrey, is its viscid and mucilaginous root, which may be classed among the neglected treasures of the vegetable kingdom. These roots are, at present, chiefly employed by colour-makers, who, by means of a decoction made of them, extract the beautiful crimson colour from *gum-lac*. The natives of Angora, who possess the finest breed of goats in the world, prepare from the comfrey-roots a kind of glue, that enables them to spin the fleece into a very fine yarn, from which camblets and shawls are manufactured. The Germans have lately employed the same mucilage for correcting the brittleness of flax, and roughness of wool, in spinning: this preparation neither soils the fingers nor the yarn, and may be preserved in a fresh state for many days, in close wooden boxes.

TABERNAMONTAN, in his *German Herbal*, relates a curious fact, which, if not exaggerated, would be of great value in the important process of *tanning*, and rendering leather *water-proof*. He boiled, in a pailful of water, ten pounds of the fresh root, dug out in Novem-

ber, till one half the liquor was evaporated: with this decoction, when cool, he repeatedly dressed the leather which, thus prepared, became not only more durable than by any other method, but it always remained pliable and elastic.....M. Dorffurth, an apothecary of Wittenberg, in Germany, also employed these roots in his experiments on tanning, with considerable success. After drying and reducing them to powder, or cutting the fresh roots into small pieces, he infused them in a proportionate quantity of water, frequently stirring the mass, till it acquired the consistence of treacle. It was then allowed to stand at rest several days, till the fibrous and woody part had subsided, when the clear fluid was poured off, or passed through a basket lined with straw. By dropping diluted oil of vitriol into this liquor, he precipitated the mucilaginous part, which was again filtred and rendered fit for another process of tanning, after depriving it of its acidity, by means of a ley made of common pot-ash......Another German writer, M. Reuss, mentions the root of the comfrey among those plants, from which good starch and hair-powder may be prepared.

COMMERCE, the exchange of commodities, or the buying, selling, or trafficking of merchandize, money, or even paper, with a view to obtain profit.

Commerce is at present divided into commerce by *land* and by *sea*; *inland* or domestic, and *foreign*; and by *whole-sale* and *retail*. With respect to *domestic* commerce, we may observe, that it is under the King's supreme protection, as it belongs to his prerogative to establish public markets and fairs; to regulate weights and measures; and to issue money, which is the universal medium of commerce, authority and currency.

The greater part of the commerce of this country is carried on by collective companies, some of which are incorporated under charters, with an exclusive privilege; a practice which is, perhaps, justly due to the company that first introduces a peculiar branch of commerce; but, when such exclusive right is continued for a kind of perpetuity, we venture to pronounce it to be highly detrimental to the welfare of the nation, as well as to the interests of trade in general.

The history of commerce, being less connected with the object of this work than its influence on the moral and physical prosperity of a people, we shall add only a few aphorisms, which appear to us fully established, by the evidence of ancient history, as well as from the nature and complexion of some recent events: 1. That, though commerce doubtless tends to improve the intellectual faculties of man, and renders him more skilful in the various ornamental arts, but especially those of war and luxury, yet at the same time it creates a thirst of power and riches, which by no means contribute to his moral perfection; 2. That opulence, acquired by the rapid succession of fortunate events in commercial speculation, does not stimulate the mind to humane and virtuous actions, in so beneficial a manner as the slow and honest acquisitions of the artist and husbandman. 3. That large fortunes arising from commercial channels, constitute a *rich*, but not a *wealthy* nation; because those individuals, who have amassed property, by bold

enterprizes, are more prone to apply their money to the support of political and financial schemes, while the industrious cultivator of the soil, or manufacturer, will be disposed to promote the more useful and *permanent* objects of national pride, namely, those of rural and domestic economy.

COMPASS, is an instrument of considerable utility for surveying land, dialling, &c. Its structure varies but little from that of the mariner's compass; for, instead of the needle being fitted into the card and playing on a pivot, in this instrument it plays alone; the card being drawn on the bottom of the box, and a circle divided into 360 degrees on the limb. It is particularly useful to travellers, to direct them in their road; also to miners, whom it guides in digging; and may be applied to various other purposes.

COMPLEXION, generally signifies the temperament, habitude, and natural disposition of the body; but more frequently the colour of the face and skin. In the latter point of view, it has in no small degree exercised the attention of naturalists, who have attempted in vain to reconcile the specific variations among mankind, which are supposed to arise from the difference of colour, stature, or disposition. The arguments drawn from such variations have been proved to be inconclusive, and are now generally exploded. It remains, nevertheless, a difficult matter to account for the remarkable difference of colour existing among different nations.

Without entering into a minute discussion of this subject, we shall only observe, that colour and figure, like other peculiarities, are created by continual, progressive, and almost imperceptible degrees. Nations are susceptible of habits, both mental and corporeal, in the same manner as individuals; which are transmitted to posterity, and augmented by inheritance. National features, like national manners, though slowly, become fixed after a long succession of ages; and, if we can ascertain any effect, produced by a given state of weather, or of climate, it will require only repetition, during a sufficient length of time, to impress them with a permanent character.

The principal colours observable among mankind, are the following: 1. Black; as in the Africans under the equinoctial line, the inhabitants of New-Guinea, and of New-Holland. 2. *Swarthy*; as in the Moors of the north, and the Hottentots of the south of Africa. 3. *Copper-coloured*; as the East Indians. 4. *Red-coloured*; as the Americans. 5. *Brown-coloured*; as the Tartars, Persians, Arabs, Chinese, and the Africans on the coast of the Mediterranean. 6. *Brownish*; as the inhabitants of the southern parts of Europe, namely, the Sicilians, Spaniards, and Turks, and also the Samoiedes and Laplanders, who border on the Northern Pole; and the Abyssinians, who live in the middle and southern parts of Africa. 7. *White*; as most of the more northern nations of Europe are, namely, the English, Swedes, Danes, Germans, and Poles; to whom may be added the Circassians and Georgians in the north-west of Asia, and also the inhabitants of the islands in the Pacific Ocean.

Those of our readers who may wish to see these observations farther pursued, we must refer to an ingenious *Essay on the Causes of the*

variety of Complexion and Figure in the Human Species, published a few years since by Dr. S. S. SMITH, President of the College of New-Jersey. They will also find some excellent strictures on this subject in Mr. CLARKSON's elaborate *Essay on the Slavery and Commerce of the Human Species*, 8vo. 3s. 1788.

Having given this general view of the subject, we cannot suppress the observation, that many unthinking persons are more anxious to preserve and improve their complexion, particularly that of the countenance, than to inquire into their animal economy, and to regulate its different functions. The face, indeed, when not disguised by art, is often the index of health and disease; though it is absurd to consider it as the *cause* of those changes which take place in the body; whereas it exhibits only the *effect*. Hence we may confidently assert, that *all* contrivances of crafty empirics, perfumers, travelling mountebanks, &c. which are pompously offered to the public in daily prints, or by means of bills and pamphlets, containing specious certificates, to induce the giddy, the idle, and unwary multitude (nay, sometimes the lady of rank and fashion), to purchase those "beautifying compositions"....are mournful instances of human folly, and moral depravity. Those superficial persons, however, who are determined to cure the *surface*, and neglect the *inward* state of their decaying frame, by paying little or no attention to their mode of living, we reluctantly consign to the head of COSMETICS: others on the contrary, whose minds are not irretrievably biassed in favour of *external* applications (at which even the untutored *negro* would smile), we refer to the different articles connected with diet and regimen.

[COMPOSITION. (of Forsyth.) Take one bushel of fresh cow-dung, half a bushel of lime rubbish of old buildings, (that from the ceilings of rooms is preferable), half a bushel of wood ashes, and a sixteenth part of a bushel of pit, or river sand. The three last articles are to be sifted fine before they are mixed; then work them well together with a spade, and afterwards with a wooden beater, until the stuff is very smooth, like fine plaster used for the ceilings of rooms. Where lime rubbish cannot easily be procured, pounded chalk, or common lime, after having been slaked a month, may be used. If any of the composition after using it, be left for a future occasion, it should be kept in a tub or other vessel, and urine of any kind poured on it, so as to cover the surface.

The mode of applying this composition has been already noticed under the articles Apricot, Apple-tree, and Canker, but it may be well to state it more particularly in the present place.

All dead, and injured parts must first be taken away, and the sound fresh wood laid bare, leaving the surface of the wood very smooth, and rounding off the edges of the bark with a draw knife, perfectly smooth: then lay on the plaster $\frac{1}{8}$ of an inch thick; and take a quantity of dry powder of wood ashes mixed with a sixth part of the same quantity of the ashes of burnt bones, put it into a tin box with holes in the top, and shake the powder on the surface of the plaster, till the whole is covered over with it, letting it remain for half an hour, to absorb the moisture;

then apply more powder, rubbing it gently with the hand, and repeating the application of the powder till the whole plaster becomes a dry smooth surface.]

COMPOST, in agriculture, is a certain mixture designed to promote vegetation, instead of dung. To effect this purpose, various experiments have been made, of which we shall mention the following.

An oil-compost was invented by the ingenious Dr. HUNTER, author of the *Georgical Essays*, who directs 12 pounds of North American pot-ash to be broken into small pieces, and dissolved in four gallons of water. This mixture is to stand 48 hours, when 14 gallons of coarse train-oil should be added.... In a few days the alkaline salt will be liquefied, and the whole, when stirred, become nearly uniform.... Thus prepared, it should be poured on 14 bushels of sand, or 20 of dry mould, and the whole turned frequently over, for about 6 months, at which time it will be fit for use. When these ingredients are mixed with one or two hogsheads of water, they will form a fluid compost, to be used with a water-cart. The inventor himself, however, acknowledges that it is much inferior to rotten dung; yet, from various experiments, it appears to be a tolerable substitute for that article.

A compost prepared from putrified animal substances will, doubtless, be preferable to any other manure: the only obstacle to their being more generally employed, is the difficulty with which they are procured. The following is recommended by Dr. HUNTER, of York: Take a sufficient quantity of saw-dust, and incorporate it with the blood and offal of a slaughter-house, putting a layer of each, till it becomes a moist and fetid composition. Two loads of this compost, mixed with three of earth, will be sufficient for an acre of wheat or spring corn, and should be laid on the soil at the time of sowing, and harrowed in with the grain. As it lies in a small compass, it is well calculated for the use of those farmers who are obliged to carry their manure from a distance. Hence we recommend this preparation as a substitute, both for fold-yard and stable-dung, because it is extremely rich, and exerts its fertilizing influence longer on the soil; which, however impoverished, will thus be restored to its pristine vigour.... See also MANURE.

COMPOST, in gardening, is a mixture of various earths, earthy substances, and dung, either for meliorating the soil of a garden, in general, or promoting the vegetation of some particular plant.... There are few vegetables which do not delight in some peculiar earth, where they thrive better than in others.....As the reader will find this subject discussed in the alphabetical order of plants, or under the different botanical articles, it would be superfluous to enlarge upon it in this place.

[The great value of Compost manure is now beginning to be well understood by the farmers in Pennsylvania, particularly those near the city of Philadelphia, by whom greater crops are unquestionably produced than in almost any other part of the state, Lancaster county excepted.

Mr. WM. WEST, of Upper Derby township, Delaware county, has done much towards effecting a happy change in the bad system of farming which formerly prevailed.

and in particular has been of infinite service in shewing what great advantages the neglected weeds of the fields and fence sides, and the leaves of the woods may produce, if properly attended to and converted into manure.

Mr. West directs the yard where the compost is to be made, to be considerably *concave*, and the bottom laid over four or five inches deep with the toughest clay, and this stratum to be covered with strong gravel well pounded in, to prevent its removal when the manure is taken out. Into this yard he directs to hawl in the autumn, a quantity of earth taken from the top or under surface, and of the quality adapted to the land to be manured. That is, if a sandy and open soil, he takes clay, and if clayey, sandy soil. He cuts down all the weeds about the farm before they seed, and together with the leaves from the woods, hawls them into the yard, where they receive a sprinkling of lime, to promote their putrefaction, and are formed into a heap with the stable dung, and enriched by the urine which flows from the cattle stalls.

If the proportion of stable manure be much less than the other materials, the quantity of lime may be increased, in order to favour the decomposition of the vegetable matter. This will take place in about one year, when the manure may be hawled out to the ground requiring it. Much time may also be saved by the farmer making a compost heap on the head lands of fields intended to be manured; for this purpose, the weeds, leaves, mud from creeks or swamps, and waste hay, may be collected in a heap, mixed with lime, dung from the fields, and earth from the head lands. One faithful mixing is sufficient, for as Mr. Bordley justly observes, often turning the compost may weaken it as a manure, by checking the fermentation of the mass. In this way a diligent farmer may greatly increase the richness of the land, at the same time that he rids his fields of noxious weeds and briars. Several heaps of compost of different qualities, according to the nature of the soils requiring a dressing, may be made either in the field, or in the barn yard. As the water drains from them, it should be carefully collected and thrown on the heap. And that it may not be lost by soaking in the ground while the farmer is necessarily occupied in attending to other matters; wooden troughs, or gutters, paved with clay and gravel, well pounded, or with lime and gravel mixed with boiling hot lime-wash, and spread with a trowel, may be made to convey the liquid to a tight barrel sunk in the ground; whence it may be thrown upon the heap at a leisure time. See Manure.]

Compound. See Houses.

COMPRESSES, in surgery, are very useful applications, for preventing a wound from bleeding, or swelling, as well as in the treatment of aneurisms, ruptures, and *indolent* tumours of every kind..... They generally consist of folded pieces of linen cloth, so contrived as to make a gentle pressure upon any particular part.......After the plaster and other dressings are applied, surgeons frequently cover the whole with a *compress*, to secure and fix their applications, and to preserve the parts from the injuries of external air, which would retard the process of healing.

Compresses are likewise frequently used, where no plasters

are required; and in this case, either dry, or moistened with certain liquors, which are supposed to be strengthening, emollient, cooling, &c. For such purpose, they are dipped into decoctions of different herbs, into wine, spirits, vinegar, lime-water, solutions of water, sal-ammoniac, &c. either hot or cold, according to the nature of the case. But the principal use of compresses appears to be that of filling up any cavity or depression of the parts, so that the dressings, especially in fractures, may be applied with greater security; and to prevent the bandages from occasioning a troublesome irritation or other pain, and uneasiness on the skin. Hence they ought to be cut out in circular pieces, nicely adjusted to the diseased parts, and each of them progressively increasing in diameter

CONDUCTORS, are long rods made of iron or other metal, employed for protecting buildings from the effects of lightning.

The utility of conductors is universally acknowledged, yet it has not been ascertained, till within these few years, whether pointed or blunt ones were the most proper: the former, however, are now decidedly preferred, in consequence of several experiments, made under the inspection of the Royal Society. Instances, nevertheless, occur of houses provided with pointed metallic conductors, being stricken with lightning; so that this philosophical contrivance has not yet arrived at perfection. We, therefore, communicate with satisfaction the following improvement in conductors, made by Mr. ROBERT PATERSON, of Philadelphia, for which the American Philosophical Society adjudged him the prize of a gold medal. He proposes first to insert, in the top of the rod, a piece of the best *black-lead*, about 2 inches long, and terminating in a fine point which projects a little above the end of its metallic socket; so that if the black-lead point should by any accident, be broken off, that of the rod would be left sharp enough to answer the purpose of a metallic conductor. His second intention is, to facilitate the passage of the electric fluid from the lower part of the rod into the surrounding earth. In many cases it is impracticable, from the interruption of rocks and other obstacles, to sink the rod so deeply as to reach moist earth, or any other substance that is a tolerably good conductor of electricity. To remedy this defect, Mr. PATERSON proposes to make the lower part of the rod, either of tin or copper, which metals are far less liable to corrosion or rust, than iron, when lying under ground; or, which will answer the purpose still better, to coat that part of the conductor, of whatever metal it may consist, with a thick crust of black-lead previously formed into a paste, by being pulverized, mixed with melted sulphur, and applied to the rod while hot. By this precaution, the lower part of the rod will, in his opinion, retain its conducting powers for ages, without any diminution.

In order to increase the surface of the subterraneous part of the conductor, he directs a hole, or pit, of sufficient extent, to be dug as deep as convenient; into which a quantity of *charcoal* should be put, surrounding the lower extremity of the rod. Thus, the surface of that part of the conductor, which is in contact with the earth, may be increased with little trouble or expence; a circumstance of the first

importance to the security against those accidents....as charcoal is an excellent conductor of electricity, and will undergo little or no change of property, by lying in the earth for a long series of years.

[The experience of every year convinces us that metallic conductors, or lightning rods, are not certain safeguards against lightning: it is of infinite importance, therefore, to state a certain mode by which all *possible* danger may be avoided; this we are enabled to do from the directions given by the late G. C. MORGAN, in his lectures upon electricity; (Norwich, 1794.) and the editor is happy in stating, that the method was highly approved of by that distinguished philosopher, Dr. PRIESTLEY, and was the one which he constantly recommended in England, when consulted on the occasion.

The foundation of each partition wall of the house must be laid on a strip of lead; or the lead must be fastened to the sides of them...... These strips must be connected, and their dimensions not less than one-fourth of an inch thick, and 2 inches wide. A perpendicular strip on each side of the house, should rise from this bed of metallic conductors to the surface of the ground: there a strip should be continued around all the house, and carefully connected with water pipes, &c. The strips on the sides of the house should then be continued to the roof, where the method of guarding the bottom must be imitated. The top is to be surrounded by a strip, whose connection should spread over every edge and prominence, and hence must continue to the summit of each separate chimney.

The chimnies in particular must be protected, for Mr. MORGAN was witness to a case in which a house was guarded, in most respects, according to the method just described: but from the chimnies having been left unprotected, the lightning consequently struck one of them, where its rage terminated; but the tumbling of the chimney into the roof was attended by serious consequences. By guarding the house, we make it of all objects, that which is the most likely to become the circuit of a cloud; and consequently should be careful that no interruption divides the conductors, for the havoc will probably take place.

The expence of a conductor, erected according to the plan described, may be considerably lessened, by making a proper use of the leaden pipes and copings which belong to most houses; no other skill being requisite, than that of fastening the strips of lead, so that they may be secure, and at the same time be connected with each other.

Ships may be also easily protected. One strip of metal should surround the deck; another should be fastened to the bottom, or the side of the keel; these strips should be connected with others which embrace the ship in different parts.

If the vessel be copper-bottomed, nothing more is necessary than to connect the metal which surrounds the deck with the copper, but in both cases, a separate strip should pass from the rest of the strips to each mast; no injury can then possibly happen below deck. This is a circumstance of considerable importance; for the conductors which are usually designed for the masts, are moveable, and injury has often been the consequence of

neglecting to place them in their proper situation.

The protection of the masts must be managed by extending a metallic body along the stays to as great a height as possible. Chains are frequently employed for this purpose; but strips of lead are cheaper; they are not separated by any interruptions; they are not so liable to injury from the weather and salt water as iron is, and, might be fastened without annoying any necessary movement.

CONDUCTORS, of *heat*, see HEAT.]

CONGELATION. See ICE.

CONSTITUTION, is the particular temperament of the body, which depends chiefly on the state of its humours or fluids, and sometimes also on the solids, but especially the nerves.

It is curious, says Dr. PERCIVAL, to observe the revolution that has taken place, within the last century, in the constitution of the inhabitants of Europe. Inflammatory diseases occur less frequently; and in general are less rapid and violent in their effects, than they were formerly. This advantageous change, however, is more than counter-balanced by the introduction of debilitating articles of food and drink, several of which were utterly unknown to our ancestors, but now universally prevail. The bodies of men and women are equally enfeebled and enervated: nay, it is no uncommon circumstance to meet with a very high degree of irritability under the external apearance of great strength and robustness. Hypochondriacal complaints, palsies, dropsies, and all those diseases that originate in debility, are now generally endemial; and hysterics, which were formerly peculiar to women, attack at present either sex indiscriminately. A variety of causes must concur to effect so great and universal a revolution. The first of these is the general use of TEA; to which article we refer. The second place may, perhaps, be assigned to the excessive use of spirituous liquors; a pernicious custom which, in too many instances, originates in the former; as, from the lowness and depression of spirits occasioned by the continual use of tea, it becomes almost indispensibly necessary to have recourse to somethink cordial and exhilarating. Hence many sagacious persons pretend to have discovered the grand secret of obviating the hurtful effects of that favourite drug, by mixing a few tea-spoonfuls of *brandy* with each cup of *tea*, especially in dull or hazy weather. Thus, they gradually become tipplers; and hence proceed those odious and disgraceful habits of intemperance, which, we fear, are at present with justice imputed to many females in the middle ranks of society, who, independently of this barbarous custom, would be an ornament to their sex. Indignation and horror would strike our more temperate ancestors, could they behold their degenerate progeny approaching with rapid steps towards that humiliating state of apathy and servitude, in which many nations of Europe, both north and south of this island, languish in deplorable misery......See BRANDY and SPIRITS.

CONSUMPTION, in medicine, is a very comprehensive term, including all those diseases, in which the body, from a defect of nourishment, is gradually reduced to a state of debility and emaciation. This fatal disorder may arise from

a great variety of causes, such as a mal-conformation of the trunk; straitness of the chest; intemperance of whatever kind; obstructions in the pulmonary vessels, suppression of any natural evacuations; as likewise in consequence of pleurisies, coughs, catarrhs, diarrhœas, grief, intense study, &c. More frequently, however, it originates from a neglected cold, especially in constitutions where a peculiar hereditary disposition prevails, without any other discoverable cause.

Accordingly as consumptions are accompanied with fever, or exempt from that symptom, they may be divided into *three* classes: 1. Such as are occasioned by the hectic fever, which, however, is not the consequence of exulcerated lungs: See HECTIC FEVER; 2. Those in which the wasting of the body, as well as the fever, arise from pulmonic ulcers: See LUNGS; and 3. Where the gradual emaciation is unconnected with any febrile symptoms. Of the last species only, which is generally called atrophy, we shall treat in this place.

An *atrophy* always proceeds from a want of due assimilation of the nutritious juices, so that there is obviously a defective appetite, and a vitiated digestion, from the very commencement of the disease. What share the depression of the animal spirits, or an unusual irritability of the nerves, may have in the production of this malady, appears to be doubtful; and they may be considered as the effect, rather than the cause of the complaint which pervades the whole system.

Symptoms of Atrophy: General languor of body and mind; an unhealthy look of the face; a light and unsettled sleep; the appetite now voracious, now nauseating, but usually most desirous of *cold* food; straitness of the breast, and uneasiness after eating; great internal heat and dryness of the tongue; gradual wasting of the body; continual feverishness and thirst, especially during the night; at length, a fever nearly resembling a hectic, and a total privation of strength and spirits.

Children and young persons are very liable to this disease: the former, from the unhealthy milk of a nurse addicted to passions, particularly grief and anger; the latter, from the use of improper food; heavy and feculent malt-liquors; the suppression of night sweats, especially when occasioned by large draughts of cold beverage; by eating voraciously of crude, thick, heavy and obstruent food; drinking spirituous liquors; long continuance of worms, &c.....Scrophulous adults, and those who have lost large quantities of blood, are also subject to atrophy.

Although this is one of the least dangerous species of consumption, yet, when neglected in its commencement, it frequently proves fatal. Hence the evacuations by stool ought to be strictly attended to, and if the stomach be foul, a gentle emetic previously administered. A diluent and nourishing diet, as circumstances may require; country air; but particularly sweet whey, and the mucilaginous bitters, such as decoctions of the eryngo-leaved liverwort, and the wood of quassia, will be of eminent service. No remedy whatever is, in this complaint, equal to the *warm bath*, which should be gradually reduced to a *cool*, and at length to a *cold* temperature, as soon

as the patient is able to bear it..... (See vol. i. p. 204 and 205)..... Among the various domestic medicines, which have been occasionally employed for the cure of what is called a *nervous atrophy*, we are from experience convinced, that none are better calculated to restore an emaciated frame, than the conjoined use of the Salep-root, vulgarly denominated Female foolstones, or Meadow ORCHIS (*Orchis Morio*, L.) and the jelly obtained from the red garden-snail (*Helix Pomatia*, L.): Two drams of the former, in powder, boiled in a pint of whey to the consistence of a thick mucilage, ought to be taken twice a day; and from six to eight of the latter dissolved over a slow fire, in equal quantities of milk and water, with the addition of a little cinnamon and sugar, should be used every morning.... *But*, if the patient's appetite be considerably impaired, he may begin the course of these remedies in much smaller doses, which might be imperceptibly increased.

All *symptomatical consumptions*, however, are so far incurable, as they depend upon the particular disorders from which they originate; and, if the latter can be remedied by art, there is no danger to be apprehended from the former: hence it is of the utmost importance to distinguish a simple atrophy from a confirmed hectic, or a pulmonary consumption. In the last mentioned two cases, all the symptoms are more violent, and either the lungs or the tracheal, mesenteric, and other glands, are exulcerated; whereas, in an atrophy, those glands are only indurated, or otherwise obstructed.... And though we disapprove of those over-nice distinctions, which serve to perplex rather than to instruct, yet, in this case, it is essentially necessary to discriminate between an atrophy and the rickets, scrophula, and that consumptive weakness of children, who pine away for want of a due supply from the breast, or in consequence of diseases preying upon the constitution of the mother, or nurse. Indeed, there is but too much reason to believe, that the foundation of consumptive diseases is often laid in the cradle, by the faulty management of nurses, and the ill-judged tenderness of parents; by keeping children too warm; permitting them the breast too long; and the imprudent administration of opiates, practices not less detrimental than common. Thus, Dr. R. RUSSELL justly remarks, the process of converting aliment into chyle is injured, the habit of body rendered lax, the blood becomes too serous, the glands destined to moisten the joints increase in bulk, the heads of the bones are enlarged, and the glands of the mecentery, chest, and neck, are obstructed, till at length those of the lungs become also affected.

The alarming increase of consumptions, in this country, affords an ample field for medical speculators. It is no less astonishing than true, that about *one-third* of those who die in London, fall victims to that merciless disease, if the bills of mortality be taken as the basis of that calculation. In the three years of 1796, 1797, and 1799, the number of deaths, in the British metropolis, is stated to be 52,237; and among these were, under the general head of consumptions, 17,559. Although the framers of these bills have probably classed many other *chronic* dis-

orders under the head of *decline* and *consumption*, so that, perhaps, one-half, may be fairly deducted from their statement, and referred to other maladies, yet even the remaining number of about 3000 annually, in London alone, is sufficient to serve as a warning to every parent, and head of a family, in order to avoid those *causes* which we have before recited.

[So many books have been written upon this common disease, that it would seem impossible to say any thing new on it. It may be well, however, for the editor to add a few general remarks which are the result of experience, and of a particular attention to this complaint.

It must be observed, that the true consumption only, is alluded to: the general wasting of the body arising from a gradual decay of the powers of nature, or from a course of intemperance or debauchery, or from other causes, more properly belongs to the article "ATROPHY."

By far the greater part of all true consumptions arise from *neglected colds*. A cold is therefore never to be trifled with, but should be attended to with the greatest care. If a fever, and a sense of fullness attend, small bleedings, (viz. 6 to 8 oz.) should be prescribed, frequent doses of nitre (10 gr. three times a day) and purges of glauber salts, or *soda phosphorata* taken, dissolved in gruel, together with diluting drinks of barley or rice water, or infusion of flaxseed in boiling water, and sweetened with honey; and small doses of laudanum.

Confinement to a room of a temperature as equal as possible, is of great consequence. The diet should be more sparing than usual, for the first days: after which the accustomed mode of living, (if temperate) may be resumed.

By this plan of proceeding, most catarrhs which very commonly are suffered to distress a person for weeks, may be easily cured.

But should it happen that a cold has been neglected, and symptoms of consumption appear, small bleedings must be repeated every four or five days, low diet used, gentle purges of the neutral salts above mentioned taken, together with small doses of nitre, and a free use of demulcent drinks above referred to, jelly of calves feet dissolved in water: refined liquorice, or sugar candy may also be frequently dissolved in the mouth and will greatly assist in allaying a teasing cough. Much benefit has been derived from two or three drops of laudanum taken three times a day in a small quantity of liquid, by allaying the cough without heating the system. But the great point to be attended to, is the *preservation of an equal temperature in the atmosphere which the patient breathes*. A frequent alteration of heat and cold is *death* to an irritable consumptive system. Hence, if convenient, the consumptive patient should remove to the state of GEORGIA, in the month of November, if the attack has taken place before that time; or he may visit that mild climate any time during the winter, should the symptoms make a formidable *appearance*, (which they sometimes do,) after the cold weather has commenced. It is to be regretted, that this change of climate is often delayed until a late period of the disease, when the strength is so much exhausted that sufferers cannot take sufficient exercise to assist

the climate in restoring health.... Whereas, did they remove from our variable climate early in the complaint, they would be enabled to join the important advantages of a mild climate with regular exercise. Where a change of climate cannot be effected, the uniformity of the temperature in the sick person's room day and night, ought to be carefully preserved: for this purpose a south exposure is highly favourable.

Very great mischief has been done by authors on the consumption, who have servilely copied each other and considered the complaint as *originating* in the *lungs*, and as always appearing with an *uniformity* of *symptoms*. It is with an honest pride we are enabled to state that it is to the United States the world is indebted for the discovery of the important principles upon which the cure of this formidable complaint is to be founded. Dr. Rush of Philadelphia first asserted that the consumption was originally a disease of the *whole* system and not of the lungs solely, and pointed out the great, the INDISPENSIBLE necessity of regulating the remedies by an attention to the form which the disease assumes, that is, whether it be accompanied by inflammatory symptoms, or by those of debility. Nay, it frequently appears with great muscular debility, and at the same time the pulse is so tense and corded, and the breathing so difficult as to prove the laborious transmission of the blood through the lungs, and to render a small bleeding essential, in order to prevent the progress of inflammation, and the formation of tubercles. The treatment must be therefore varied with the symptoms; thus gentle tonics, and light nourishing aliments and exercise taken when the disease puts on the appearance of debility; and mild evacuations, low diet, and rest, enjoined when inflammatory symptoms come on. A more particular account of the complaint cannot be given consistently with the plan of this work; the reader is therefore referred to Dr. Rush's works, for an original and important paper on this disease, containing directions of conduct, both as to medicine and diet, in the various forms which this complaint puts on.

The *digitalis purpurea*, or purple fox glove, has of late been much praised in the consumption. It has done some good, and has also done much harm, in consequence of being given without due attention to the *state of the system*, at the time of its exhibition. The digitalis produces very powerful effects upon the pulse, which it diminishes both in force and frequency in a remarkable manner, and hence ought never to be given, unless inflammatory symptoms are present. But the discussion of the points to be attended to, in the use of this powerful medicine must be deferred until we come to the article DIGITALIS.]

CONTAGION. [By contagion is commonly understood, a specific matter generated in persons in a diseased state, and capable of communicating the particular disease to another person by approaching within the sphere of its influence.]

In some cases it is conveyed by immediate contact or touch; in others, by infected clothes, such as cotton, and particularly wool, which of all substances is the most susceptible, because it is extremely porous. Contagious matter is

also, though we apprehend erroneously, said to be transmitted thro' the air, at a considerable distance, by means of effluvia arising from the sick, in which case the atmosphere is said to be infected.

Some authors have asserted, that the gout and consumption are likewise contagious; but this appears to be very doubtful. To obviate as far as possible all infection, we would recommend to those who are obliged to attend patients, never to approach them *fasting*; and, while they are in their apartment, to avoid both eating and drinking, and also the swallowing of their own saliva. Nor will it be altogether useless to chew myrrh, cinnamon, and similar drugs, which promote a plentiful discharge from the mouth. As soon as a person has returned from visiting an infected patient, he ought immediately to wash his mouth and hands with vinegar; to change his clothes, carefully exposing those he has worn to the fresh air; and then to drink a warm infusion of sage, or other aromatic herbs, which tends to [excite] a gentle perspiration. It will also be of considerable service to those who are employed about sick persons, frequently to smell vinegar and camphor, or to fumigate the apartments with tobacco.

[Notwithstanding the able experiments of SIR JOHN PRINGLE and of other physicians, who have proved that alkalies, both fixed and volatile, are the most powerful antiseptics, or resisters of putrefaction, and although these experiments are confirmed by the daily experience of mankind, yet still the opinion of the *alkaline nature* of *contagion* is maintained. Hence it has been imagined that by letting loose acid fumes in infected places, they will attach themselves to the contagious atoms and neutralize or decompose them: and as has been already mentioned, under the article AIR, (Vol. I. p. 25.) GUYTON DE MORVEAU recommends the fumes of the muriatic acid as a powerful corrector of the contagion; and has published an octavo volume in praise of the remedy; but in all his experiments, and in those which have been lately instituted at Geneva, nothing was accomplished, which evacuation of the infected places, *ventilation, careful scrubbing with soap and water*, and lime-washing the walls would not have effected equally well, if not better.

It was also stated, that Dr. J. CARMICHAEL SMYTH of London is equally warm in his praises of the efficacy of the *fumes* of the *nitrous acid*, in destroying contagion. But, in the experiments which he relates to prove the efficacy of the fumes, Dr. TROTTER, physician to the fleet of England, says, "*there was deception from first to last*:" indeed it may be again repeated, that the plans of both MORVEAU and SMYTH are in opposition to the daily experience of every notable house-keeper, and, of every careful ship-master, who, as far as regards external means, require nothing but the removal of filth, and the continued attention to cleanliness to remove contagion, and to prevent its return.

This subject is so ably treated by Dr. MITCHELL in the *Medical Repository*, that the editor cannot refrain from again referring the reader to that work. He will find the nonsense of these troublesome and inefficacious substitutes for cleanliness properly exposed.

Dr. WILLICH has given some

good directions for avoiding contagion. But with regard to the vinegar and camphor, our experience, is by no means confirmed in the United States. When a person is exposed to contagion, besides attending to the general rules laid down by Dr. WILLICH, attention should be paid to the bowels, which must be opened regularly every day once or twice, by laxative articles of food, as roasted apples, prunes, or molasses and water. The diet should be light, and nothing difficult of digestion taken. New articles of food, dishes of new cooking, and fresh bread ought to be avoided. If the bowels are not moved by the diet used, clysters composed of a quart of warm water, one tea-cup full of sweet oil, and one of molasses ought to be injected daily, by means of a pewter syringe. Purgatives taken by the mouth are apt to derange the stomach, and it is of *immense consequence to preserve this organ in its usual degree of tone. One single day's excess may defeat the care and precaution of a month.*

Exciting causes of fever, such as exposure to night air, to a hot sun, or to sudden changes in the atmosphere, intemperance, late hours, and all causes of passion ought to be avoided with the utmost care. An extraordinary fear of sickness must be dispelled, if possible, by reading cheerful books, and by some constant employment of the body or mind. But probably as powerful a remedy as any that have been mentioned, is a flannel shirt worn next to the skin. This will keep up an equal and free perspiration, and has been found of essential benefit to those who have been exposed to contagious diseases, or obliged to reside in a pestilential atmosphere. It has been found highly useful during the prevalence of the malignant fever which has so repeatedly, since 1793, distressed the city of Philadelphia, particularly in the autumn, when the coolness of the mornings and evenings is considerable, and frequently excites the fever in those who are exposed at that time, and are not warmly clad.

A respectable physician of Philadelphia thinks he owes his escape during several epidemic fevers, to the irritation produced by a blister on the wrist, which he kept open. Medical men will understand the theory of the action of this remedy, which ought certainly to be tried, where an escape from the place of pestilence cannot be effected.]

CONTAGION, a disorder peculiar to cattle, more commonly called DISTEMPER to which we refer.... See also STABLES.

[CONVOLVULUS. Some species of this genus have already been noticed under the article "BINDWEED." There are several more species, natives of the United States; at present the *C. Panduratus* only will be noticed.... It is called *Wild Potatoe* in Carolina. The root is perennial, thick and long like that of a carrot. Capsule two-celled and two-seeded. This species grows very plentifully about Bethlehem; the roots are purgative, and are collected and sold, according to SHOEPF, for *mechoacanna*. They are said to be escharotic, and useful to take down proud or fungous flesh in sores.]

CONVULSION. A disease attended with irregular and unnatural contraction of the muscles, without sleep. It differs from *epilepsy*, in being accompanied neither

with any mental affection, nor with a state of torpor.

The *causes* of convulsions are not always evident, though they generally depend on a certain irritability of the nervous system.... Delicate hysteric women, and men disposed to hypochondriasis, are equally subject to this disorder. Frequently, however, convulsive symptoms take place in consequence of wounds, irritations of the stomach and intestines, worms, poisons, violent cathartics, emetics, &c.

When infants are attacked with convulsions which threaten their lives, the safest expedient will be to immerse them into tepid or milk-warm water, and keep them in that situation, by adding gradually a little hot water, so as to preserve an equal temperature of 96 or 98 degrees, till medical assistance can be procured.

Although we are not inclined to give implicit credit to anonymous authorities, yet we think the following particulars worthy of insertion. A correspondent in the 22d volume of the *Gentleman's Magazine*, justly observes, that convulsions in children, before dentition, generally proceed from acrid, irritating humors produced in the first passages, by living chiefly on acescent food; such fits being preceded by gripings, green stools, &c. He therefore directs one ounce of white sugar candy to be reduced to fine powder, and 120 drops, or two drams, of the best oil of aniseed, to be dropped upon it: these should be rubbed together in a mortar, then mixed with an ounce of spermaceti, in powder. The dose is twenty grains, to be given in a little milk drawn from the breast, and to be repeated every three or four hours, or oftener, if the uneasiness of the child should require it. To judge from the nature of these ingredients, we are induced to believe, that such a preparation, if cautiously administered, may be productive of good effects.

In young persons, however, there is always less danger than in adults; and as we propose to communicate some important matter respecting the treatment of these complaints, under the articles EPILEPSY and SPASM, we shall at present only state another remedy that has lately been used, on the Continent, with uncommon success: it simply consists of the liquid vegetable alkali (*Oleum Tartari per deliquium.*)....Dr. MICHAELIS, of Leipzig; Dr. KARGENS, of Kiel, and several other physicians, have prescribed from 15 to 25 drops of it to be taken for a dose, by children several years old, as well as adults, and frequently repeated, according to circumstances; though we should hesitate to administer so large a dose as 25 drops, every five minutes, to a child three years and a half of age, as has been successfully practised by the first-mentioned gentleman. Hence, we would recommend to regulate the number of drops, according to the age of children, so as to commence with five drops, under twelve months old, adding one drop for every year, and to convey this medicine in a little thin gruel, or weak broth.

[Convulsions are frequently occasioned among children by indigestible food or other substances in the stomach; which is no sooner removed either spontaneously, or by means of an emetic than all the alarming symptoms disappear; and without this, every medicine will

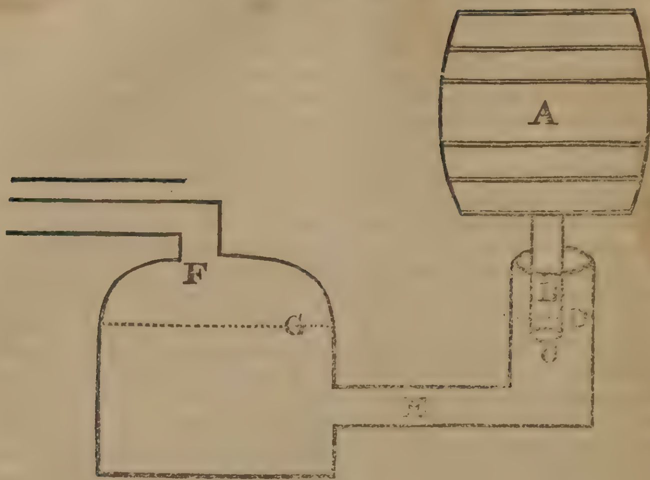
fail of procuring relief. Food will often remain many hours undigested, before it produces any bad effects. I have known a piece of *cheese-cake* lie in the stomach two days without the appearance of any bad consequences; but at the end of that time *convulsions*, and the most alarming faintings alternately followed, nor did they cease until the *cheese-cake* was discharged, when by the help of an anodyne every symptom of disease vanished.]

COOKING, the art of dressing or preparing food. It is effected by various methods, of which *boiling* is the most common, but also the most objectionable; as it deprives flesh of its nutritious juice. A better mode of dressing animal food is *roasting*, by which its strength is less dissipated; because a crust is soon formed on its surface, that more effectually preserves the nutritive particles from evaporation. Hence, one pound of roasted meat is, in *real* nourishment, equal to double that quantity of boiled animal food.

Many substances, though naturally possessed of salubrious qualities, are rendered unwholesome, by the refinements of cookery. By compounding several incongruous ingredients, to produce a poignant sauce, or rich soup, the cook frequently forms compositions that are almost poisonous. Thus, high seasoning of every kind, pickles, and the like, merely stimulate the palate, and cannot fail to injure the stomach. Hence, the plainest dishes are uniformly the most conducive to health, while they are most easily digested. This self-evident proposition is acknowledged by every reflecting person, but gives the least satisfaction to the epicure, who consults his taste, before he appeals to his warped understanding.

Animal food is generally boiled in half-open vessels, instead of which, close utensils only ought to be employed for that purpose. We therefore preferably recommend the process called *stewing*; as it is not only the most wholesome mode of dressing meat, but at the same time well adapted to retain and concentrate the most substantial parts of animal food. The utility of preparing victuals after this method, having been generally acknowledged, various patents have been granted to persons for the invention of machinery, by which that object may be attained, at the smallest expence. Of these, we shall communicate the following; for the better illustration of which we have subjoined Cuts.

A patent was granted, in December, 1793, to Mr. Stanley Howard, of St. Paul's Church-yard, iron-monger, for his invention of a machine which he calls a *Pneumatic Kitchen*, for cooking provisions by steam; in such a way, that no complex machinery is required for supplying the boiler with water, to replace the quantity dissipated by evaporation, nor any pump (the boiler being constantly supplied during the evaporation, without the aid of a cistern); which apparatus may be fixed at a small expence, without any alteration of the chimney; and, when once arranged, requires no repair. The steam-boiler, and cooking-vessels,



being made in the usual way, the former is to be supplied with water by a fountain-reservoir, marked A, which is to be placed at a convenient distance from it, with its discharging tube, marked B, inserted in a cistern, or pipe, marked C; in which the surface of the water will, by means of the fountain, be preserved always at one height, pointed out by the letter D: and by a communication marked E, from the said cistern or pipe, with the steam-boiler, marked F, the water therein will, during the evaporation, be preserved at a height corresponding with such cistern or pipe, and always at the same level, marked G. By means of the fountain above mentioned, the necessity of cocks and pipes, or pumps, for supplying the boiler, is obviated; and the supply rendered more immediate, more certain, and at the same time more simple, than by any method hitherto contrived. The fountain may be made of any materials, or in any form, suited to the purpose.

A patent was likewise granted, in December, 1796, to Mr. James Tate, of Tottenham-court-road, iron-monger, for a *portable cooking machine*, for the use of officers in the army or navy, which is provided with lamps.

This machine, and its various component parts, may be constructed of any of the different metals, of which similar articles are usually made. And, though it is at present described only as operating with a lamp and oil, yet the patentee proposes to construct such as may be used with common fuel, as wood, coal, &c. upon different scales or sizes.

[A cut of the machine, comprising the various articles of Tate's apparatus, when made portable, is given by Dr. Willich, from the 8th vol. of the *Repertory of Arts*, but as it is impossible to comprehend the arrangement of them

from such a view, the cut has been omitted. A plate of the apparatus in full operation may be seen in the above mentioned work.]

COPAIBA, or BALSAM of COPAIBA, a liquid resinous juice, issuing from incisions made in the trunk of the *Copaifera balsamum*, L. a tree growing in the Spanish West Indies, of which there is only one species.

The juice is clear and transparent, of a whitish or pale yellowish colour, an agreeable smell, and a bitterish pungent taste. It is usually about the consistence of oil; when long kept, though retaining its transparency, it becomes nearly as thick as honey; and, unlike other resinous juices, does not acquire a solid state.

Genuine balsam of copaiba dissolves entirely in rectified spirits, especially if a little alkali be previously added to the liquor: the solution has a very fragrant smell. When distilled with water it yields a large quantity of a limpid essential oil: and in a strong heat without addition, an oil of a blue colour.

With respect to the medicinal properties of this balsam, it is said to be both corroborant and detergent. It strengthens the nervous system, tends to open the bowels, in large doses proves purgative, and promotes the secretion of urine. It has also been recommended in dysenteries, and in diseases of the breast and lungs. FULLER observes that he has known very dangerous coughs, cured by the use of this balsam alone; and though, being hot and bitter, it produces good effects, even in hectic cases. We advise, however, great circumspection in its use; as it can be of service only in particular circumstances. The dose of this medicine, should not exceed from 20 to 30 drops. It may be conveniently taken when mixed with a thin syrup, or in the form of an emulsion, into which it may be reduced, by triturating it with a thick mucilage of gum arabic, till both ingredients are well incorporated, and then gradually adding a proper quantity of water.

[Balsam Copaiba ought never to be given in coughs where inflammatory symptoms are present: but in the catarrhal affections to which old persons are liable, it is an useful medicine. A convenient way to take it, is to wrap it up in brown sugar, drinking a glass of water after each dose. In the *fluor albus*, or whites of women, it is an useful medicine; in the piles it has occasionally been serviceable.]

COPAL, improperly called *Gum copal*, is a resinous substance obtained from the concrete juice of the *Rhus copallinum*, or narrow-leaved sumach, a native plant of North America, known there by the name of *Beach-sumach*. This resin is imported in irregular masses, some of which are transparent, of a yellowish or brown colour, others are whitish and semi-transparent. It possesses a more agreeable odour than frankincense, but is, unlike other gums and resins, neither soluble in water nor in spirit of wine. By these properties it resembles amber; which has induced some to consider it a mineral bitumen similar to that substance. It yields on distillation an oil, which like mineral petrolea, is indissoluble in spirit of wine.

[As the directions necessary to be attended to in the manufactory of copal varnish, apply equally to varnishes of all kinds, the whole will be treated of under the latter

article. *Much original, and highly important information will be given on the subject.*

For an account of the tree producing the gum copal, see article Rhus.]

COPPER, one of the finest imperfect metals, is found in the bowels of the earth, in the following states.

I. Native or pure copper, which possesses the red colour, the malleability, and all the other properties of this metal, and is discovered in various parts of England and Wales, but more particularly in the county of Cornwall. It is formed into threads or branches, and lies in veins of considerable thickness, contained in blackish serpentine stone, mixed with a brownish red, and covered externally with a greenish nephrites.

II. Mineralized by fixed air; of which there are several varieties: 1. *Red* copper, or hepatic ore of copper, which is known by its dusky colour. It is generally mixed with native copper and mountain green. 2. *Earthy* copper, or mountain green, which is mostly found in a loose friable state, and frequently blended with calcareous earth, iron, and sometimes with arsenic.

III. Mineralized by sulphur, with a small proportion of iron. This is of a deep violet grey, or liver colour, melts with a gentle heat, is ponderous, flexible, and yields to the knife. When broken, it appears of a bright golden colour, and is the richest of all the copper ores, affording from 80 to 90 per cent. of copper, 10 or 12 of sulphur, and a small proportion of iron.

IV. Mineralized by sulphur, with a large proportion of iron, or azure copper ore; it varies from the preceding sort only in the quantity of iron it contains, which sometimes amounts to 50 per cent. It yields 50 or 60 pounds of copper per cwt. the rest being sulphur.

The principal parts of Great-Britain, which afford copper, are the counties of Cardigan, Chester, Cornwall, Cumberland, Derby, Devon, Northumberland, Lancaster, Salop, Somerset, Stafford, York, Warwick, Westmoreland; in the Islands of Mann and Anglesey; and also in Scotland.

Copper is less difficult to be purified than iron; and, when exposed to the air, calcines, being converted into a green rust or calx, which is soluble in water, and imparts an astringent taste, as well as pernicious qualities.

When taken into the human body, copper acts as a violent emetic, and is generally considered as poisonous: and though it has occasionally been prescribed by physicians, it is always an unsafe and hazardous remedy. Hence, the greatest precaution is necessary in using this metal, of which so many kitchen utensils are manufactured. Beside the most scrupulous attention to cleanliness, it is extremely improper to leave any liquid to cool in a copper vessel; for this metal is more easily decomposed by liquids, when cold, than in a heated state.

In order to prevent the deleterious effects of copper, the vessels made of it are usually covered with tin, on the inside. It is nevertheless justly complained, that the tinning of copper vessels is not sufficient to defend them from the action of the air, moisture, and saline substances; because, even when strongly coated, they are liable to rust. This may be reme-

died by a thicker covering of tin; and a manufacture of this kind was established a few years since at Edinburgh; in which the following method is adopted: The surface of the copper is made very rough by means of a machine contrived for that purpose; then a thick coat of tin is laid on, and the copper hammered smooth as before. To prevent the tin from being melted, and the surface of the copper from being left uncovered, in consequence of a degree of heat superior to that of boiling water, the tin is alloyed with iron, silver, or platina, in order to diminish its fusibility, and render it capable of being applied in thicker layers on the copper.

A patent was also granted, in August, 1770, to Mr. MAURICE CRAWFORD, of Edinburgh, for his new method of tinning copper, which would last *ten times* longer than that by any former process. This patent is now expired; we shall, therefore communicate the following particulars: The copper must be wrought in the common way, till it is ready for the first *pickling*, which should be performed in the usual mode. It is next *frozen* on the inside, on rough stakes, or by any other method of freezing, which opens the pores of the copper, and causes the tinning to penetrate. It is then to be pickled a second time, and scoured clean on both sides, when it should be coated with sal ammoniac and grain tin; after which the copper should be well lined with a metal, consisting of one pound of grain-tin, and one pound and a half of zinc, spelter, or other metal of equal wholesomeness and durability: when this operation is performed, the outside should be scoured clean, and *rough-planished* on a bright stake. The inside is also to be rubbed with chalk and water, till the tin become clean, when it is to be polished, and smoothed hard to give it a gloss. Ladles, skimmers, and all such culinary utensils, as require to be tinned on both sides, are to be frozen on a cut stake, in the manner already mentioned, and dipped in the melted metal. By this process, the vessel will be much more beautiful and regular, better calculated to resist the effects of heat, and at the same time prevent fatal accidents.

[The following new process for tinning copper and other vessels in a durable manner, is given by M. BUSCEHNDORE of Leipsic, in the *Journal fur Fabrik, manufacture, und Handlung, for October* 1799.

"That copper and brass vessels cannot be used with safety in cooking victuals or for holding articles of food, and particularly those which contain acids, is well known. It is also well known that the tinning applied in the usual manner is not durable, being soon worn away by cleaning, and on that account must be frequently renewed. Some, therefore, have proposed enamelling for kitchen utensils of copper; which, indeed, would answer exceedingly well, and be much safer for the health than impure tin mixed with lead, often employed for tinning; but, unfortunately, enamel is too dear, and readily breaks when the vessel receives the least blow; which cannot always be avoided.

The following process for tinning is attended with no danger from poisonous ingredients, as no lead is used in it; the tinning, too, is exceedingly durable, adds

strength to the copper vessel, and secures it from the action of acids much longer than the common tinning. When the vessel has been prepared and cleaned in the usual manner, it must be roughened on the inside by being beat on a rough anvil, in order that the tinning may hold better, and be more intimately connected with the copper. The process of tinning must then be begun with perfectly pure grained tin, having an addition of sal-ammoniac instead of the common colophonium. Over this tinning, which must cover the copper in an even and uniform manner throughout, a second harder coat must be applied, as the first forms only a kind of medium for connecting the second with the copper. For this second tinning you employ pure grained tin, mixed with zinc in the proportion of two to three, which must be applied also with sal-ammoniac smooth and even, so that the lower stratum may be entirely covered with it.

This coating, which by the addition of the zinc, becomes pretty hard and solid, is then to be hammered with a smoothing hammer, after it has been properly rubbed and scowered with chalk and water, by which it becomes more solid, and acquires a smooth compact surface.

Vessels and utensils may be tinned in this manner on both sides. In this case, after being exposed to a sufficient heat, they must be dipped in the fluid tin, by which means both sides will be tinned at the same time.

As this tinning is exceedingly durable, and has a beautiful colour, which it always retains, it may be employed for various kinds of metal instruments and vessels, which it may be necessary to secure from rust."

The Journal from which the above excellent receipt is taken, is published monthly at Leipsic, and contains a judicious selection of papers on the improvements of the arts, and many original articles on the same subjects, and on the various branches of domestic economy. The editor has several numbers of the work, and regrets there is no similar publication in the United States.]

Copper is likewise applied to various other purposes: when combined with tin and zinc, it is employed in enamel painting, dyeing, &c. If it be mixed with a considerable proportion of tin, it produces what is called bell-metal; if in a smaller quantity, BRONZE. With zinc it forms BRASS, PINCHBECK, &c. according to the proportions used. [To make hard copper, add to the copper $\frac{1}{4}$ or $\frac{1}{5}$ of tin.]

With respect to the poisonous qualities of copper, when introduced into the stomach, it is less dangerous than arsenic; as the former is more easily dissolved.—And though the editors of the *Encyclopædia Britannica* have declared that they have not met with any well authenticated instance of a person who has died in consequence of having swallowed even *verdigrease* itself, yet so many examples have lately occurred, that there is not the least doubt of the deleterious properties of copper. Of the many cases that might be adduced, we shall select one, which is authenticated by Dr. PERCIVAL, of Manchester. A young lady had eaten about 3 or 4 ounces of pickled samphire, strongly impregnated with copper,

and had drunk afterwards the 5th part of a pint of vinegar, on an empty stomach. She had not applied for medical aid, for two days, and in the course of ten she died. Dr. PERCIVAL is of opinion, that an emetic, if it had been administered in an early stage, might probably have saved her life. Persons apprehensive of the pernicious effects of copper, have been successfully relieved by castor oil, or clysters; and, if any suspicion arise of metallic salts having been swallowed, the same physician judiciously recommends calcined magnesia, as it will not only decompose them, but at the same time gently contribute to carry off the noxious matter.

[The Chinese are known to possess the secret of manufacturing copper utensils perfectly white.... The discovery of this secret would be important for the arts in the United States, as copper abounds in them, and ought to be attempted by the medical gentlemen on board the Canton ships. Doubtless a pecuniary compensation would effect this desirable object. The attention of a friend (just returned) was directed to the subject, and the artist to whom he applied on the subject insisted that the copper was not altered by any process, but was dug up white, and presented a piece of the ore as proof of his assertion. This specimen was unfortunately left in Canton.]

COPPERAS, a name given to green vitriol, particularly to that of iron. It is purified and prepared in the same manner as alum and saltpetre, being passed through several lixivia till it is wholly reduced to crystal. It is used in dyeing wool and hats black, in making ink, tanning leather, and in preparing a kind of Spanish brown for painters.

A patent was granted in May, 1791, to Mr. WM. MURDOCK, of Redruth, Cornwall, for a method of making (from the same materials, and from processes entirely new) copperas, vitriol, and different sorts of dye, or dyeing stuff, paints, and colours.

The patentee directs any quantity of what remains after the calcination of mundic, or such other ores as contain sulphur, arsenic, and zinc, to be taken and washed in water; which is to be placed on the top, or on any other part of the kiln, house, or oven, while the mundic or other ores are burning; the heat of which will cause the water to evaporate; or the water may be evaporated to a crystallizing point, by exposing it to the heat of the sun, after which it should be suffered to stand for 24 hours, or longer, when crystals of copperas, or green vitriol, will be produced. From this process arises a considerable saving; as the ores remaining after fusion, may be applied to various chemical purposes.

CORAL, *Corallina*, L. a genus of insects, consisting of eight species, which are found in the ocean.

There are, properly, but three kinds of coral, namely, red, white, and black; the last of these is the rarest and most esteemed. When coral is first taken out of the sea, the small protuberances on its surface are soft, and yield on expression a milky juice, which effervesces with acids. The cortical part, or the external coat, is not so compact as the internal, and may easily be separated, while in a fresh

state. The greatest traffic in this article is carried on at Genoa and Leghorn.

Coral is not unfrequently imitated, by artificial compositions, so as to resemble the real. But this fraud may be detected, by exposing it to fire; as the counterfeit does not afford the alkaline earth, yielded by the genuine coral. The colouring ingredients employed in preparing the former, are cinnabar and minium, both of which are easily ascertained. The natural coral seems to receive its colour from iron, as spirit of vitriol acquires from it a ferruginous taste; and on calcination, some particles are discoverable among the ashes, that are attracted by the magnet.

Various unsuccessful attempts have been made to extract a fine colour from red coral, the *Isis nobilis*, L. by means of spirit of wine. The method of obtaining it is as follows: Dissolve a pound of sugar in a little water, add to it half a pound of wax, then take a pound of coral, and boil them together. Thus, the coral will part with its redness, and remain in other respects unaltered. In order to prepare this tincture, the wax and sugar must be previously dissolved in spirit of wine.

CORALLINE, or Sea-moss, a branched cretaceous substance, of a white colour. It is the habitation and production of polypi, found on rocks, and sometimes on the shells of fishes. It is celebrated as a vermifuge, and, according to GEOFFROY, may be given in powder, from 10 grains to a scruple, or half a dram per day, with considerably good effect. But we doubt whether it possesses any medical virtues, as it is perfectly insipid to the taste, and operates merely as an absorbent earth.

CORD, a combination of several threads of hemp, twisted together by means of a wheel.

Cords are extensively useful for various purposes of domestic life, but more particularly in the rigging of ships; in which case they are, according to their size, called cables, or ROPES, to which we refer. Hence, the manufacture of these articles has become an object of considerable importance.

In the common way of making cordage, it has been found, that, by being twisted too tight, ropes were rendered incapable of raising weights beyond a certain proportion, and that, from the friction occasioned by their inelasticity, they were neither very durable, nor always safe. Various means have been devised to obviate this defect, and several patents have lately been granted, from which we select the following.

In July, 1792, Mr. JAMES MITCHELL, of Poplar, and Blackwall, Middlesex, obtained a patent for a method of manufacturing cordage on a scientific principle. It apparently consists in subdividing the twists or cylindrical parts of ropes, or cordage, and giving them a peculiar turn, so as to make them blend and unite; and also to operate in such a manner that the component parts act in spiral directions, similar to parallels. By this mode, the yarns all bear together, so that the cordage acquires an increased degree of tension, as well as a greater power of resisting fluids and friction, and also a more uniform elasticity.

A patent was also granted, in January, 1798, to Mr. W. CHAP-

MAN, of Newcastle-upon-Tyne, for a new method of manufacturing ropes or cordage. The patentee describes his invention to consist in placing those parts that separately twist the rope and *strands* (each of which contains a number of yarns twisted together) at a certain determinate distance. By such means, the process of twisting is not completed through the whole length at once, but only in the intermediate space. With this circumstance, the patentee combines a mode of twisting the cord or rope itself by an arbor or shaft, perforated either through the whole or a part of its extent, and revolving round its own axis; and which, at the same time, twists its several parts, by means of separate arbors or shafts, either perforated or otherwise, each of which performs a like revolution. Thus, not only the operation of twisting the cord or rope is effected, but also that of coiling it up, by the motion of the machine, while both time and length of ground are saved, which, according to the prevailing mode of making cordage, are uselessly occupied.

Another patent which we shall notice, is that granted in August 1799, to JOSEPH HUDDART, of Islington, Esq. for an improved method of forming the strands in the machinery for manufacturing cordage. The leading principle of this invention is, to give the length of the yarns composing the strand, a certain ratio, in proportion to the hardness, or compression, with which the rope is intended to be *laid*, and thus to acquire a more equal distribution of the strain upon the yarns, than upon ropes made in the common way. This is effected, 1. By keeping the yarns separate from each other, and drawing them from revolving bobbins, in order to keep up the twist, while the strand is forming; 2. By passing the yarns through a register, which divides them by circular holes (Mr. HUDDART says, circular shells of holes); the number in each being agreeable to the distance from the centre of the strand, and to the angle which the yarns make with a line parallel to it, that gives them a proper position to enter; 3. By a cylindrical tube, which compresses the strand, and maintains a cylindrical figure to its surface; 4. By a gauge, to determine the angle which the yarns in the outside shell makes with a line parallel to the centre of the strand, when registering; and, according to the angle made by the yarns in this shell, the length of all the yarns in the strand will be determined; lastly, 5. By hardening up the strand, and thus increasing the angle in the outside shell, which compensates for the stretching of the yarns, and compression of the strand. By attending to these directions, every yarn in the strand will bear a strain, when at the point of breaking: and, when laid into a rope, it will acquire additional strength.

CORD. In June, 1801, a patent was granted to Mr. WILLIAM CHAPMAN, for the application of certain substances designed to preserve cordage; and which, being either with difficulty soluble, or totally insoluble in water, tend to render such ropes more durable, than has hitherto been practicable. The usual method adopted for this purpose, consists in boiling tar *alone*, till it be inspissated to a proper con-

sistence; but Mr C. proposes to boil the tar in two or three different waters, till it be divested of its acid, and all the mucilaginous particles; which, by the common process, remain in the liquid preparation; and, by their speedy tendency to decomposition, frequently contribute to the decay of the ropes, at an earlier period than would naturally take place without such practice. He therefore adds a due proportion of suet, tallow, or any fixed oil, that has been deprived of extraneous matters, by similar boiling.

CORIANDER, the COMMON, or *Coriandrum sativum*, L. is an annual plant, growing in corn-fields, on road-sides, and dunghills. This vegetable is raised from seed, generally sown in the month of March, in the proportion of 14lbs. to an acre. It is also cultivated together with caraway and teazel; but as neither of those plants comes up completely and regularly the second year, they are usually allowed to stand for the third summer. If sown with caraway, the coriander requires great care in hoeing, to distinguish it from the former, which is not set out for a crop, till the latter is harvested. When reared alone, the plants of coriander are set out from four to six inches apart, and produces whitish flowers that blow in June or July, and contain two seeds. The leaves of this vegetable have a strong, disagreeable smell; the seeds possess a pleasant flavour; and, when encrusted with sugar, and sold by the confectioners, under the name of *coriander comfits*. They have been recommended as carminative and stomachic; but certainly possess intoxicating, if not deleterious properties: Six drams of them, however, have been taken at one dose, from which Dr. WITHERING did not observe any remarkable effect.

Coriander seeds are now used only in the bitter infusions and preparations of senna, the disagreeable taste of which they completely overcome.

CORK-TREE, or *Quercus suber*, L. a species of oak indigenous in Spain and Portugal, where it attains the height of from 30 to 40 feet; has a thick, rough, fungous bark, and oval serrated leaves, which are downy underneath.

The bark of this tree furnishes that useful material, *cork*; which, becoming of a thick fungous nature, is separated from the trunk, while a new bark is formed under it, which, in the course of six or seven years, is sufficiently thick for *barking*. Nevertheless, the tree continues to vegetate, and another fresh bark grows under the former, which likewise affords cork in the same period of time.

In the *Gentleman's Magazine* for 1758, we met with the following curious contrivance of a *cork-waistcoat*, for the purpose of preventing accidents by drowning. It was invented by Mr. DUBOURG, and is composed of four pieces of cork, two for the breasts, and two for the back, each being nearly of the same length and breadth as the quarters of a common waistcoat, without flaps; the whole is covered with coarse canvas, having two holes to put the arms through.... There are spaces left between the two back pieces and each back and breast piece, that they may the more easily be adjusted to the body. Thus, the waistcoat is open only in the front, and may be fastened on the wearer with strings; or, if it

should be thought more secure; with buckles and leather straps.

The weight of this cork-waistcoat does not exceed twelve ounces and may be made at a very moderate expence. It is more simple in its form than any other contrivance for a similar purpose. Mr. DUBOURG has made a trial of its efficacy in the Thames, and found that it not only supported him on the water, but that even two men, with their utmost efforts, were not able to sink him. Hence it is eminently calculated for mariners, passengers at sea in general, and likewise for all those who resort to bathing-places for the benefit of their health; as the most timorous and delicate person may, with perfect safety, boldly venture with one of these waistcoats into a rough sea. See BAMBOO-HABIT.

The expence of providing a sufficient number of them for the British navy, can be no objection to a nation so gratefully fond of a powerful marine establishment. Those of our readers who are desirous of obtaining farther information on the subject of *cork-waistcoats*, we refer to a treatise written by Mr. J. WILKINSON, and entitled *The Seaman's Preservation, or Safety in Shipwreck*, printed in 1759, 8vo.

Cork is applied to various uses, by different nations. The Egyptians made coffins of it, which being lined with a resinous composition, preserved dead bodies from corruption. The Spaniards burn it, to make that kind of light colour we call *Spanish black*, used by painters. They also employ it to line stone walls; an expedient which not only renders them much warmer, but also corrects their moisture in damp weather.

In medicine, the bark, as well as the acorn of the cork-tree, are reputed to be astringent, after being burnt, reduced to powder, and used externally. But in Britain, the former is principally employed for stopping bottles and casks, and lining the inner soles of shoes and slippers.

[Other vegetables have been found, which may be employed instead of Cork, for stopping bottles, jugs, &c. Among these is the wood of a tree common in South America, in moist places called *Monbin*, (*spondias lutea*). This wood is brought to England in great abundance for that use. The spongy root of the Tupelo tree (*Nyssa*) a native of the United States, is also used for the same purpose, as are the roots of liquorice which on that account is much cultivated in Sclavonia, and exported.

A laudable attempt has lately been made, by the commander of one of our national frigates, to introduce the Cork-tree into the United States, but failed, owing to bad weather on the coast. The attempt ought to be repeated; our Consuls in Spain, Portugal and the Mediterranean should permit no vessel to leave the ports where they reside, without putting a young tree on board. In the States of N. and S. Carolina and Georgia, cork-trees would undoubtedly thrive.]

CORN, in rural economy, the grains or seeds of plants, which are separated from the ear, and used chiefly for making bread.

There are several species of corn, such as wheat, rye, barley, oats, millet, and rice, maize, or Indian corn, &c. each of which will be mentioned in its alphabetical order: we shall, therefore, in this place, not enter into any particu-

lars relative to its culture, confining ourselves solely to such points as relate equally to the different species.

We cannot but animadvert upon the injudicious practice of cutting corn in *cold* autumns, before it is perfectly ripe; as experience has proved, that, if left standing, the ears will continue to fill, and become heavier, even during the autumnal frosts. Were this latter method adopted, a much greater proportion of flour might be produced; and the grain would neither shrink, nor shrivel, in barns or granaries: it might, at the same time, be prevented from rotting, on account of its immaturity, and the softness or moisture which are the necessary consequence.

Notwithstanding the great care and attention which the husbandman may bestow on the cultivation of corn, his expectations of a plentiful harvest are often frustrated by a variety of disorders, and accidents, to which corn is peculiarly liable.

The first, and most formidable is the *smut*, which is caused by vermin breeding in the grain, and thus destroying its substance. (See vol. i. p. 183.) Their propagation, beside other causes, is evidently facilitated by laying on the soil too large a quantity of crude dung; which becoming mouldy, promotes the generation of the smut-animals.

Various experiments have been accordingly tried, to eradicate this noxious distemper, with different degrees of success; a few of which we shall enumerate. In the greater part of the counties of Devon and Cornwall, on the evening before the wheat is intended to be sown, it is laid on the floor in a heap, on which is poured a solution of lime, slacked with boiling water, and reduced to the consistence of cream: both are then mixed, and left together till morning, by which time the wheat is dry and fit to be sown.

In other parts of the same counties, the wheat is steeped either in fresh or salt water, for 12, 18, or 24 hours, when it is put to drain for an hour or two, after which, powdered lime is sifted over it, the whole being well mixed with a shovel: it is then thrown together in a heap, to dry previously to its being sown. Few farmers, however, soak it in brine, and a still smaller number of them, substitute animal urine, soap-boiler's ley, &c. In several other counties, there prevails a general practice of employing brine, strong enough to bear an egg, to which powdered lime is added, till it acquires an unctuous consistence. This composition is mixed with the wheat, the evening before it is committed to the ground. In Yorkshire, and several of the adjoining counties, arsenic is substituted for salt: some farmers render the solution thicker by the addition of lime, while others either sprinkle the wheat with it, or steep and wash the former, then sift lime over it, and mix them as before.

Another method is, to put 70 gallons of water into a tub, at the bottom of which is a hole provided with a staff and tap hose, as in brewing; to this is to be added half a hundred weight of limestone, and the whole well stirred for half an hour, when it is suffered to stand about 30 hours. It should then be drawn off into another tub, and three pecks (42lbs.) of salt added, which, when dissolved, will make a strong pickle, fit for immediate use. But, if sca-

water can be procured, half the quantity of salt will be sufficient. A basket of about 2 feet in diameter at the bottom, and 20 inches deep, should then be placed in the pickle, and the corn gradually immersed, in small quantities from one to two bushels; care being taken to skim off the light grains, which ought not to be sown, because many of them are infected with the smut. As soon as this operation is completed, the basket should be drawn up, and drained for a few minutes over the liquor, when it may be repeated, as often as the quantity of grain to be sown may require. This seed will be fit for the ground in 24 hours; but, where it is to be drilled, it should stand for 48: and, if the driller meet with any difficulty in performing his work, it will be necessary to make the pickle more astringent, by adding lime. Seed, thus prepared, may be kept for 5, 6, 7, 8, or even 10 days above ground, without any injury or inconvenience.

Another mode of preventing the smut in corn, was discovered by Mr. R. Trefrey, of Beer, in Flintshire; who, in a communication to Mr. Young, in the 21st vol. of "*Annals of Agriculture*," states, that having rubbed out a quantity of corn, he sowed part of it unwashed. The remainder, about two bushels, was well winnowed, taken to a brook, and washed in the following manner: A gallon was put into a wire sieve, that had 8 bars to an inch; it was first gently immersed a few times in the water, by which means every smut-ball, or animal, was easily discovered, and taken away; next, the sieve was briskly agitated, for about a minute, when the whole, after being washed, and thrown into a tub with some water, was stirred round with a broom. It was then again put into the sieve, in the same proportion as before, and immersed in the brook, that the remaining particles might sink through the bottom of the sieve, and be carried away by the stream. This wheat was sown in the same field with the former, where no kind of manure could have the least tendency to produce smut-balls among either. The result at harvest proved, that the unwashed corn produced as many smut-balls as grains of wheat, while that which had been immersed in the brook, was almost entirely exempt from the disorder.

We venture to recommend the last-mentioned expedient; for the superiority of gradual washing over that of throwing the whole into a vessel and stirring it, is manifest. By this method, the infectious matter is not only loosened from the grains, but is carried away with the stream, while that, which is only washed in a tub, &c. cannot be totally cleared; for the more ponderous particles sink to the bottom, and remain among the seed-corn after the water is poured off.

Corn is also liable to be *grown or sprouted*, when it has partly begun to vegetate; for, if the whole of the grain were to bud, it would become unfit for being converted into bread. Hence it is very difficult to preserve sprouted corn, as the opening of the bud occasions it to *heat*, and the moisture it retains, disposes it still more to undergo the process of fermentation. It is also more subject to be attacked by insects, on account of its being sweeter, more tender, and susceptible of heat, consequently more liable to receive their eggs. If left to itself, sprouted corn heats, fer-

ments, and contracts an unpleasant smell, and a bad colour: it also acquires a disagreeably sharp taste, which is communicated to the flour and bread; and finally grows mouldy and sour: in this state, it is fit only for the manufacture of starch. Farther, it is ground with difficulty, clogs the mill-stones, chokes the bolting-cloths, and yields but little flour, which is soft and moist, and will not keep for any length of time, especially during warm weather.

We have entered thus largely into this subject, because, from the variableness of the climate of this country, considerable quantities of corn frequently become sprouted: we therefore extract, with satisfaction, the following interesting particulars, for remedying this serious evil, from an ingenious pamphlet published in France.

Sprouted corn should by no means be stacked, but housed and threshed with the greatest expedition. Nor should it be put in a granary together with dry grain, as the latter will thus become moist. Care should also be taken to keep the place well aired; for, in the contrary case, even the latter cannot be preserved.

As soon as sprouted corn is threshed, it should be spread upon the floor, and frequently turned; a door, or window, being left open to give vent to the steam. Sometimes it will be necessary to dry the corn in an oven, after the bread is removed; leaving the door half open, and turning the grain every ten minutes, to facilitate the evaporation of the moisture. When it is thus dried, it should be sifted, and not put into sacks, or in heaps, till it is properly cooled; as it will otherwise become mouldy.

Although some fastidious persons may object to the trouble occasioned by this mode of curing sprouted corn, yet as eight or ten days continual drying will preserve it for a whole year, and render both the bread and flour of a better quality, it surely merits the attention of every diligent husbandman, and will amply compensate his trouble and labour.

There is another disease that frequently attacks corn, which is usually termed *burnt-grain*, of which we have already spoken, vol. i. To these may be added, what is called the *spur*, which affects both wheat and rye, but more especially the latter. The grains infested with it, are thicker and longer than the sound ones; their outsides are either brown or black, and their surface rough. If a *spurred* grain be opened, a white flour is perceivable in it, which is covered with another of a reddish or brown colour. The latter has some degree of consistence, but may be easily crumbled between the fingers. Naturalists are unable to ascertain, with precision, the cause of this distemper; but it is supposed to be occasioned by the bite or sting of an insect, that turns the corn into a kind of gall; a conjecture which is partly confirmed by the taste left on the tongue, after eating such grain..... The effects arising from the use of corn thus damaged, are said to be malignant fevers and gangrenes, in consequence of which the extremities of the body sometimes mortify, and spontaneously separate, without any pain or effusion of blood.

Among the various insects which prey upon corn, none is more destructive than the *corn-butterfly*, which is generated in a manner similar to that of the common but-

terflies. It settles on one grain, and after having totally consumed it, its existence is supposed to be prolonged by eating its own excrement. When it has attained its full growth, it is about one quarter of an inch in length, and half the thickness of the grain it has devoured. To exterminate this noxious insect, it has been recommended to prepare a very strong ley of wood ashes, to which, when it becomes yellow, as much quick-lime should be added, as will make it of a dusky white: while it is as hot as the hand can well bear it, the grosser part of the ley should be suffered to subside, and the ley poured off into a proper vessel; into which the corn is to be immersed by means of a basket, and quickly agitated; skimming off those grains which float on the surface. In the course of two or three minutes, it may be taken out, and the basket with its contents suspended on two poles, to drain; after which, it should be spread on the floor of a granary to dry, while a second basket undergoes a similar immersion. This simple process not only preserves the grain from rotting, but at the same time destroys all those insects that may have penetrated its substance.

An oven is also employed for drying the seed; but, as it is difficult to ascertain the proper degree of heat, without injuring vegetation, and yet not always sufficient to extirpate the vermin, it is seldom practised.

Another method lately discovered for the preservation of corn, is that of *steaming it*: this valuable fact was communicated by J. L. BANGER, Esq. of Madeira, to Mr. MIDDLETON, who has inserted extracts of his "*View of the Agriculture of Middlesex*." Our limits not permitting us to detail his various experiments, we shall only state, that he steamed grain, which was much infested with the weevil, in January, and again in June. Three months after, it was in perfect preservation, being free from the depredations of that insect: and such mode of preserving grain is strongly recommended by this circumstance, that it not only yields, when ground, a larger proportion of flour; but it also retains its vegetative principle, and may be advantageously sown. Farther, as some able agriculturists attribute the *smut* to an insect which infests corn, Mr. BANGER conjectures that such distemper may be effectually prevented by steaming.

The following methods are said to be practised with great success on the Continent: Immerse pieces of hempen cloth in water; and after expressing the fluid, spread them on the infested heaps of grain: in the course of two hours, the weevils will be found adhering to the cloths, from which they must be carefully collected, to prevent the insects from escaping, and then immersed under water, in order to drown them. These vermin may also be expelled, by laying a branch of *Hen-bane* [or elder] in the middle of a heap of grain: in such cases it will be necessary to watch them, so that they may be caught in the attempt of effecting their escape.

The last method of extirpating the Corn-butterfly, within the circle of our information, is that of distributing a number of large ant-hills throughout granaries and barns, in the month of June, when these magazines have been emptied of grain. The ants immedi-

ately attack and devour all the weevils: this expedient was suggested in a Paris paper; stating, at the same time, that no vermin of the latter description had appeared on the premises of a farmer, who had availed himself of those industrious insects.

With respect to the manner of preserving it, corn is very different from fruits; as, with proper care, it may be kept in granaries for several centuries. Far from wishing to support that execrable system of monopoly, which is but too conspicuous at present, to the injury and oppression of the groaning poor, we shall communicate the following directions, with a view to avert any *future* scarcity, rather than to enable the avaricious corn-dealer to withhold his stock from the public market. For this purpose, the grain should be well dried and cleaned before it is housed; care being taken to introduce air-holes on the top and openings to the north and east of the granary: during the first six months, the corn should be carefully turned, once a fortnight at the least, to prevent it from heating; after which time it will be sufficient to turn it every month, for about two years, when it will have exhaled all its igneous particles, and no apprehension need be entertained, unless from the air and adventitious moisture. Should it nevertheless *heat*, from any unforeseen accident, so that there is apprehension of its catching fire, such a misfortune may be easily prevented, by making a hole in the middle, down to the floor, which will serve as a kind of chimney, or flue, for carrying off the heat.

A new method of preserving this valuable grain, is the following: Let a hollow cane or tube, about 3 feet 9 inches in length, be provided; tapering gradually to a point downwards, in order that it may be more easily thrust to the bottom of the sack. About 150 holes, $\frac{1}{8}$ of an inch in diameter, must be made on each side of such hollow cylinder, to the height of about 2 feet 10 inches from the bottom; and, in order to regulate the perforation, it will be advisable to wind a pack thread round the stick, in a spiral form; so that the holes may be about $\frac{1}{2}$ an inch apart at the bottom, and be gradually at greater distances as they approach the top; being then one inch above each other; by which expedient a due proportion of air will be conveyed to the lower part of the corn. To the upper extremity of the cane, there should be fixed a leather pipe, 10 inches in length, and distended by means of two yards of spiral wire coiled up in it: to the upper end of such tube, a wooden fauset is to be fitted, for introducing into it the nozzle of a pair of bellows, in order to ventilate the whole sack.

If grain, when first deposited, be thus aired every second or third day, for 10 or 15 minutes, all moisture will in a short time be dissipated, and the corn will afterwards remain dry and sweet in the sacks, with very little additional trouble. This simple practice may be advantageously adopted for the preservation of every kind of seeds and grain, excepting *barley*; which, if once separated from the ears, can by no means be prevented from fermenting.

But notwithstanding these precautions, it frequently happens that *mites* reduce the greater part of the grain to dust. This serious damage may be prevented by rubbing the adjacent places with fetid oils

and herbs, such as garlic and dwarf-elder, the strong smell of which tends to expel them: besides, they may be exposed to the rays of the sun, which immediately destroy them.....One of the most effectual means of extirpating both the white and black corn-worm, as well as to secure the grain from the depredations of mice and rats, is that of covering the corn with the branches of the alder buck-thorn, or black berry-bearing alder, *Rhamnus Frangula*, L. The exhalations of this plant are so offensive to every kind of vermin, that they not only prevent their generation, but also effect the destruction of those which have been carried in with corn from the fields, or granaries. We state the fact on the authority of Mr. HOCHHEIMER; and as the experiment is not attended with any considerable expence, it certainly merits the attention of the *wholesale* farmer.

Among the numerous suggestions of foreign writers, for preserving grain from the devastations of insects, we shall only mention those of smoking the store-houses with sulphur and tobacco (which, however, renders the corn unfit for vegetation); of covering the heaps of grain either with thin sail-cloth or old sheets, rolling them together when the vermin are settled on the surface, and exposing them to the voracious appetite of poultry in the farm yard; of brushing them off the walls with hard brooms; of introducing ants, their greatest enemies, into the granary; of exposing dead lobsters; and, lastly, of ventilating the whole building, and frequently stirring the grain; remedies which, of all others, are perhaps the most efficacious methods of averting damage.

For the information of those dealers who avail themselves of *arsenic*, to destroy the rats and mice frequenting their corn-floors, we think it our duty to observe, that such a dangerous remedy ought never to be employed; as it has frequently produced the most fatal accidents, and as the excrements of the poisoned animals, where mixed with the grain, may likewise occasion disorders, the cause of which is not even suspected by physicians. Hence we advise those mercenary economists to substitute a remedy, which will be found equally effectual, and is perfectly safe: it merely consists in mixing two parts of pounded quick-lime with three parts of sugar, and placing at the side of it a separate shallow vessel with water. The heating nature of this composition very speedily excites thirst, and induces those depredators to drink eagerly: in consequence of which the lime is slacked in their stomachs, and proves inevitably destructive.

When corn has been cleared of all impurities, in the manner above stated, it may be kept for a great number of years, nay, for ages, by depositing it in dry pits covered with strong planks: but the safer method is, to cover the heap with quick-lime, which should be gradually dissolved, by sprinkling over it a small quantity of water. This causes the uppermost grains to sprout to the height of two or three inches, and incloses them with an incrustation, through which neither air nor insects can penetrate. See GRANARY.

In order to ascertain the relative

value of different species of grain, corn-dealers avail themselves chiefly of the combined criterion of weight and measure. In a commercial point of view, such a method is doubtless the most accurate; but as it cannot be explained without entering into a very diffuse detail, accompanied with numerical tables, we shall communicate to our economical readers only a few practical directions, by an attention to which, they may be sufficiently guided in the sale or purchase of corn in general:

1. Take a handful of grain from a heap, or sack, and compress it closely for a minute; then pass it from one hand into the other, and attentively examine its flavour, whether it possess any peculiar smell, different from that which is natural to the species: in which case you may conclude that it has been repeatedly exposed to moisture, and undergone a slight degree of fermentation. The flour obtained from such corn, is deficient in measure, of an indifferent quality, and affords neither nourishing, nor wholesome bread.

2. If, on pressure by the hand, the grains appear so solid and smooth that they in a manner glide through the fingers, without having any foreign smell or colour, in this case it may be pronounced perfectly dry, and in a good state of preservation.

3. Should, on the contrary, the corn feel rough, or, if a number of grains, after compressing them by the dry hand, clog together and adhere to the fingers, it may be justly apprehended that such wheat, rye, &c. is *damp*, and possessed of all the bad properties before specified.

As the nature of the present work does not permit us to enter into a minute analytical account of the specific gravity of different kinds of corn, and their relative proportion to each other (which properly belongs to the mercantile speculator), we shall supply this apparent deficiency, by the following comparative view.

Every attentive observer will find, that frequently, some species of grain bears a price in the market, far exceeding its relative value, or proportion to other kinds of grain, which, in many instances, may serve as excellent substitutes. From the prices which have prevailed in different countries, during a long series of years, we have derived the following result of numbers:

Wheat, ...	41
Rye, ...	32
Barley, ...	23
Oats, ...	14

TABLE OF PROPORTIONS.

	Wheat.		*Rye.*		*Barley.*		*Oats.*	
Wheat,	1	1	5	4	7	4	3	1
Rye,	4	5	1	1	3	2	16	7
Barley,	4	7	2	3	1	1	8	5
Oats,	1	3	7	16	5	8	1	1

It deserves, however, to be remarked, that these proportions occasionally vary, accordingly as the soil of different countries is more favourable to the production of one species of grain than to the other; and likewise as there is a greater or less demand for particular kinds of corn in the market, especially in barren or unproductive seasons. Thus, in Britain, the price of barley and oats is almost constantly disproportionate to that of wheat, and especially to *rye*, which may, consequently, be considered as the

cheapest bread-corn. The immense quantities of malt-liquors brewed in this country, and the great number of horses kept for pleasure, are sufficient reasons why barley and oats are sold at prices comparatively higher than their intrinsic value, in relation to wheat and rye. But if the rates stated in the preceding table be adopted in the computation of prices, and the farmer, or corn-dealer, be desirous to know what proportion, for instance, the price of oats bears to that of rye, let him search in the horizontal line for oats, and in front of the perpendicular line for rye: the field, or partition where both meet, contains the numbers 7 : 16, viz. that the price of oats is in proportion to that of rye, as seven to sixteen; and so forth, with respect to the other species of corn here exhibited.

[CORN, (*Indian*). In the United States, two kinds of Indian corn, or mayz, are commonly cultivated. The gourd seed-corn, (so called from its resemblance to the gourd seed)and the yellow corn; the seed of which is plump and round. The former kind is generally raised in the states of North and South Carolina, and Georgia; and the latter, in the more northern states. In some of the states, a white plump grain is also raised for the common and excellent dish *homany*. Mr. BARTRAM informs the editor, that he saw in the Creek nation of Indians, a small corn in general use, which consisted almost entirely of flour, and was easily pulverised: he thinks the most pleasant corn cakes he ever ate, were made of this kind of corn. The agent of the general government with the Creeks would render service to the state, by circulating this corn in different parts of the union.

Corn in England is the general term, for all kinds of grain, but in the United States, by *corn*, is always meant, *Indian Corn*, (*Zea Mayz*,) and to this, it is proposed to confine the present additional observations.

In the United States, the greater part of a field of corn, in some seasons, is destroyed by birds, and ground squirrels. To prevent this loss, Mr. JAMES GRAHAM, of New York, says, (*Trans. Agri. So. N. York*) he finds no plan so successful, as that of *tarring the seed*, in the following manner....Put as much corn as you expect to plant the next day, into warm water in the evening: the ensuing morning drain off the water; then pour on as much hot water as will cover it, and immediately after, throw in tar, at the rate of about one pint to a bushel, stir the tar through the corn, until the grains appear to be uniformly coated with the tar, then put it into a basket to drain: after the water has ran off, throw it into a large tub or trough, and stir among it as much ashes, lime, (slacked) or gypsum, (plaister of Paris) as will adhere to the grains; by which means they will easily separate from each other, and may be as conveniently planted, as if they had never been tarred. Mr. G. prefers gypsum, to either lime or ashes, as it will not be so likely to injure the fingers in planting, and does also, in equally small quantities, more powerfully promote vegetation.

The precaution of soaking the corn before applying the tar, is highly necessary, as the coat of tar and gypsum would otherwise, (especially in dry seasons) prevent

it from absorbing moisture sufficient to produce vegetation.

It is important too, in all cases where corn has been soaked, to plant it immediately after the plough, when running the cross furrows.

Mr. G. has experienced the good effects of thus preparing seed-corn, principally in preventing the ravages of crows and blackbirds, the most common enemies of our spring crops, but has no doubt that it will be found equally beneficial in preserving them from others, such as crows, ground squirrels, &c.

Birds are, however, not the only enemies to corn which the farmer has to contend with. Mr. PETERS observes, that the *cut-worm*, or *grubs*, destroy many of the young shoots above ground. A decoction of hellebore, mixed with sulphur, soot, and a little nitre (salt-petre) is equally offensive to vermin; and if the seed, after being soaked in this mixture, is encrusted with plaister, it *remarkably* forwards the growth.

Replanting of corn, according to Mr. PETERS, seldom answers well. Transplanting of plants raised in the garden, or in any clear and rich corner of the field, is much more eligible. This is easily managed, by sowing in drills, a small quantity of corn, at the time of planting the field. If the plants are not wanted, the loss or trouble is inconsiderable. Plants may also be had from hills in which too many seeds have been dropped. It is too common to have more plants in a *hill*, than are profitable. Three at most are sufficient. Although the places where the corn is dropped, are called *hills*, the old practice of hilling is for the most part, abandoned. The necessary use of the hoe is not omitted, but the plough is chiefly used to earth and tend the corn. Great attention should be paid to destroy the suckers, which draw off the supplies both from plants and ears.

After several experiments, in order to find the most advantageous method of planting corn, Mr. SPURRIER, of Delaware, found the following exceeded all others.

He prepared his land, by plowing it in the autumn, in single boughts; in the spring he harrowed it down as smooth as possible, and ploughed it; then harrowed it again, and marked out the furrows at *eight* feet distance: in these furrows he dropped the seed single, at about the distance of every foot; his cart loaded with manure from the compost heap, followed in the alley between, and covered the seed in the furrows, about three or four inches thick, with the manure.... This was done almost as expeditiously as in the common way, covering it with mould by the hoe.

By this method, the plants came soon up, and flourished very vigorously. When the plants were about six inches high, he ploughed between, taking the mould from the plants, throwing it up in a ridge in the middle of the alley, and with a hand hoe, cut up the weeds and superfluous plants. If they are left at two feet distance in the rows, they will be thick enough.

The next ploughing, he took the mould from the middle, throwing it up to the plants. Every time of ploughing, he used the hand hoe to stir the ground between the plants, and to destroy the weeds. The third ploughing, he did as the first, throwing up the mould in the middle of the alley. This is of more use than a person would imagine, for it admits the influences

of the air and dews to penetrate to the roots.

The fourth ploughing which was the last, he managed as the second, by throwing up the mould to the stalks of corn. If this last ploughing could be so contrived, as to be done *early in the morning*, before the sun has exhaled the dew, it would bring those riches in the ground, which would afford a double nourishment. The land, upon which Mr. SPURRIER tried this experiment, was between a loam and a clay.

Sands and light lands will not require so many ploughings.

Mr. J. of Philadelphia county, last year soaked his seed-corn in the black water of a dung heap, and in which some salt-petre was dissolved: when planting, he added a small handful of gypsum to each hill when up he put on a a little more, and *when the ears were about to set*, a small quantity was again added. His crop was very abundant, as we witnessed; and was the more remarkable, as the field had been worn out by bad management. In rich ground, however, the application of all these strong stimulants to the grain may prove injurious, by causing too great a growth of the stalk. The second application of the gypsum may in such cases be omitted.

Indian corn is commonly planted in the beginning of May, in Pennsylvania, but if the ground be rich, and gypsum used as a manure, and the season should prove favourable; the stalk will grow so tall by harvest, and the roots so numerous, that it will be difficult to plough among them.... Added to this, the farmer will not have time to attend to the corn, and as the season at harvest is commonly dry, it may suffer by neglect: a judicious farmer, therefore, of Philadelphia county, plants his corn the end of May, and thus is enabled to give it the last ploughing after harvest. He also soaks and rolls his corn in *slacked* lime, to prevent the birds picking the grains; and finds the practice successful. Mr. PETERS approves highly of this practice of ploughing after harvest, if *it be done when the weather is moist.* In a drought, it is rather dangerous. He adds, "It requires a good tilth to keep down weeds. Nothing requires more clean farming, than corn, which is seldom ploughed often enough....*Agricultural Enquiries, p.* 6.

A plain farmer informed the editor, that he made the following experiments on the comparative effects of different manures for corn.

He manured different parts of the same field of corn, with dung of cows, horses, and hogs; and the ashes of blackberry bushes and other briars cut down from the fence side: the ground manured with the ashes produced an earlier and better crop, than any other part of the ground. The hog-dung produced the next best crop. He put two shovels full of the ashes to each hill of corn. These facts which are the result of a laudable wish in a plain farmer to ascertain an important point, deserve attention.

The following account of two crops of corn, deserves to be universally known, as an incitement to the spirit of emulation and industry among farmers.

Mr. JOHN STEVENS, of Hobocken, New-Jersey, and Mr. D. LUDLOW, Westchester, betted fifty guineas upon the superiority of their crops of corn. Mr. S. ploughed his ground

three times before planting, and before the last plowing, put on 700 horse cart loads of street manure; he planted in double rows at $5\frac{1}{2}$ feet asunder, and dibbled each grain. To do this with expedition and accuracy, he bored two rows of holes in a piece of board four feet long, so as to form equilateral triangles, the sides of which were seven inches, thus:

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Into these holes he drove pegs, about $3\frac{1}{2}$ inches long. As the corn was dropped into these holes, made with this machine, a man followed with a basket of rotten dung with which he filled them up. Then came on the carts, out of which the rows were sprinkled with a coat of *street manure*. During the season the crop was suckered three times. The intervals were repeatedly ploughed, and the rows kept perfectly clean of weeds by hoeing and hand weeding. The produce of the crop was as follows:....233 $\frac{2}{3}$ measures full of corn in the ear. A measure full contained one bushel and a half and one pint of shelled corn; 233 $\frac{2}{3}$ give consequently 354 bushels and 6 quarts, or 118 bushels and 2 quarts per acre. Mr. S. is confident, that he would have had considerably more corn, had not his crop suffered very greatly by a thunder storm, which laid the greater part of it down at the time the ears were setting.

Mr. Ludlow planted in continued rows, four feet asunder, and eight inches from stalk to stalk in the rows, and manured with 200 horse-cart loads of street dirt. His crop was as follows:

Total, 182 measures of corn in the ear. Shelled corn in full measure, one bushel and a half and four quarts, which in 182 gives 295 bushels and 12 quarts, or 98 bushels and 14 quarts per acre.

These are truly noble crops, and do honour to the industry and agricultural skill of the cultivators.

A friend says, in New-Jersey, it has been found, that corn planted after clover cut in May, and the stubble ploughed yields an abundant crop. There can be no reason why the same good effects ought not to follow a clover lay for corn, as for wheat, the experience of which is so familiar to us, in Pennsylvania.

Mr. Bordley directs to cut up the corn stalks close to the ground, near the end of September, with sharp hoes, having first stripped the blades and cut off the tops, but always leaving the ears on: and to pile the stalks and corn in a pyramidal form in small parcels, to cure. A friend found some years since, that by thus exposing his corn to the frost, it ripened better than if permitted to remain standing in the field, as is commonly practised.

Darwin also says, that the frosty nights of autumn in Scotland contribute to ripen the late crops of that cold climate: he supposes the frost converts the mucilage of the grain sooner into starch.

Mr. Bordley makes the following excellent remarks: "Observing much irregularity in the standing of mayz in the rows, I caused the seed, after listing and crossing, to be carefully placed *close* to the *landside* of the furrows: not dropt in the careless scattering manner usual. The corn thus grew strait, and admitted the ploughs to pass near the plants.

The following highly valuable observations are by JOSEPH COOPER esq. of New-Jersey, and doubtless will receive serious attention; they tend to prove what perfection may be attained by continued care and attention, while at the same time, they shew the absurdity of the common opinion of the necessity for changing seed.

"In or about the year 1772, a friend sent me a few grains of a small kind of Indian corn, the grains of which were not larger than goose shot, which he informed me, by a note in which they were enclosed, were originally from Guinea, and produced from eight to ten ears on a stalk. Those grains I planted, and found the production to answer the description, but the ears small, and few of them ripe before frost. I saved some of the largest and earliest, and planted them between rows of larger and earlier kinds of corn, which produced a mixture to advantage, then I saved seed from stalks that produced the greatest number of the largest ears, and first ripe, which I planted the ensuing season, and was not a little gratified to find its production preferable, both in quantity and quality, to that of any corn I had ever planted. This kind of corn I have continued planting ever since, selecting that designed for seed in the manner I would wish others to try, viz.... When the first ears are ripe enough for seed, gather a sufficient quantity for early corn, or replanting, and at the time you would wish your corn to be ripe generally, gather a sufficient quantity for planting the next year, having particular care to take it from stalks that are large at bottom, of a regular taper, not over tall, the ears set low, and containing the greatest number of good sizeable ears of the best quality; let it dry speedily, and from the corn gathered as last described, plant your main crop, and if any hills should be missing, replant from that first gathered which will cause the crop to ripen more regularly than is common; this is a great benefit. The above method I have practised many years, and am satisfied it has increased the quantity and improved the quality of my crops beyond the expectation of any person, who has not tried the experiments. The distance of planting corn, and number of grains in a hill, are matters many differ in; perhaps different soils may require a difference in both these respects; but in every kind of soil I have tried, I find planting the rows six feet asunder each way, as near at right angles as may be, and leaving not more than four stalks in a hill, produces the best crop. The common method of saving seed corn by taking the ears from the heap, or crib, is attended with two disadvantages, one is, the taking the largest ears, which have generally grown but one on a stalk. This lessens the production; the other is, taking ears that have ripened at different times which causes the production to do the same."

Mr. DEANE says: of all soils a clayey one may justly be accounted the worst kind for this crop. A loamy soil will not answer without a plentiful dressing. But a sandy or gravelly soil is best; or sand, if it be not destitute of vegetable food. In the northern parts of New-England, it is not worth while to plant this corn on clay, or on mere loam: For it requires much heat, and these soils are not so

much warmed by the sun, as sandy and gravelly ones. On any soil it requires much tillage and manure in this country ; if either be scanty, a good crop is not to be expected.

I think it is not the best method to plant it on what we call green sward ground, at least in the northern parts. It is apt to be too backward in its growth, and not to ripen so well. But if we do it on such land, the holes should be made quite through the furrows, and dung put in the holes. If this caution be not observed, the crop will be uneven, as the roots in some places where the furrows are thickest, will have but little benefit from the rotting of the sward. But if the holes be made through, the roots will be fed with both fixed and putrid air, supplied by the fermentation in the grass roots of the turf. In this way, I have known great crops raised on green sward ground, where the soil was a sandy loam.

But in the course of my experience, I have found peas and potatoes the most suitable crops for the first year. In the second, it will be in good order for Indian corn. This, however, may be peculiar to the northern parts of New-England.

For this crop it is certainly best to plough in the fall preceding ; and again in the spring, just before planting. If the land be flat, and inclining to cold, it should lie in narrow ridges during the winter ; and if it be naturally moist, the corn should be planted on ridges ; otherwise it should be ploughed plain in the spring.

Some recommend gathering seed corn before the time of harvest, being the ears that first ripen. But I think it would be better to mark them, and let them remain on the stalks, till they become sapless. Whenever they are taken in, they should be hung up by the husks, in a dry place, secure from early frost ; and they will be so hardened as to be in no danger of injury from the frost in winter.

In the choosing of seed, some regard should be had to the state of the soil on which it is intended to grow. If it be poor, or wanting in warmth, the yellow sort with eight rows will be most suitable, as it ripens early. A better soil should have a larger kind of seed, that the crop may be greater, as it undoubtedly will.

If twenty loads of good manure can be afforded for an acre, it should be spread on the land and ploughed in : If no more than half of that quantity, it will be best to put it in holes. In the former case, it usually comes up better, suffers less by drought, and worms; and the land is left in better order after the crop. In the latter case, the plants are more assisted in their growth, in proportion to the quantity of manure. If the manure be new dung, burying it under the furrows is by far the better method.

Let the ground be cut into exact squares, by shoal furrows made with a horse-plough, from three to four feet apart, according to the largeness or smallness of the sort of corn to be planted. This furrowing is easily done with one horse, and is by no means lost labour, as the more the ground is stirred, the more luxuriantly the corn will grow. If dung is to be

put in the angles where the furrows cross each other, the furrowing should be the deeper.

The right time of seeding the ground may be from the first to the third week in May; or a little sooner or later according to the dryness of the soil, and the forwardness of the spring. The farmers have a rule in this case, said to be borrowed from the aboriginals, which is, to plant corn when the leaves of white oak begin to appear. But so much time is commonly taken up in planting this corn, it being tedious work to dung it in holes, that it will be necessary to begin in the driest part of the field a little earlier than this rule directs.

Shell the seed gently by hand, that it may not be torn or bruised at all, rejecting about an inch at each end of the ear. And, if any corns appear with black eyes, let them also be rejected, not because they will not grow at all, the contrary being true; but because the blackness indicates, either some defect in drying, or want of perfection in the grain. Put five corns in what is called a hill, and let them not be very near together; for the more the roots crowd each other, the more they will prevent the growth of each other. Four corns would perhaps be a better number, if it were certain they would all prosper. The true reasons for putting more than one in a place I take to be, that by means of it, the rows may be so far apart as to admit of ploughing between them; and that some labour in hand-hoeing is saved, it being no more work to hoe-hill with five plants, than with one in it.

If planting a second time should become necessary, by means of the destruction of the first seed, or if planting be delayed on any account till the beginning of June, then it will be proper that the seed should have boiling water poured on it. Let it not soak more than half a minute, and be cooled speedily, and planted before it dries. The corn will be forwarder in its growth by several days. The seed should be covered with about two inches of earth.

To prevent birds and vermin from pulling up the corn, steep some corn in a strong infusion of Indian poke, or refuse tobacco, and sprinkle it over the ground before the corn is up....White threads stretched over a field of corn, will prevent crows from alighting upon it. But I doubt whether this will deter any other birds.

A handful of ashes on each hill, will nourish the plants, and have a tendency to prevent their being annoyed by worms. Some lay it on just before the first, or second hoeing. It will have a better effect in preventing worms, if laid on before the corn is up. But it is commonly designed to answer chiefly as a top-dressing; and for this purpose it would answer better near the third hoeing; for then the plants want the greatest degree of nourishment, as they begin to grow very rapidly. Two dressings, to answer the two purposes, would not be amiss.

When the plants are three or four inches high, the plough must pass in the interval, making two furrows in each, turned from the rows; and then the weeds killed with the hand hoe, and a little earth drawn about the plants.... This operation we call weeding.

In about half a month after,

plough again, but across the former furrows, and turn the furrows towards the rows. Then with the hand-hoe, earth the corn as much as it will bear. This is called moulding or half-hilling.

When the plants are about knee high, and before they send out their panicles, or spindles, give them the third and last hoeing. The best way is to plough one furrow in an interval, both ways. The cultivator with two mould-boards would be better for this work, than the common horse-plough, as it would throw the mould equally towards each row, and save labour in hand-hoeing. The ground would thus be cut into squares, and the hills almost completely formed. In finishing them, care should be tak en that they be not made too high, or steep, that they may not divert the water, which falls in rains, from the roots. When hills are too much raised, they also prevent the warm influence of the sun upon the lowermost roots, by too great a thickness of earth; in consequence of which, the plants are put to the exertion of sending out a new set of roots, at a suitable distance from the surface.

Some think high hills are needful to make the corn stand upright. I never could perceive the advantage of it. But I am confident it is oftener broken by winds when the hills are uncommonly high, which is a greater evil than its leaning half way to the ground, if indeed that be any evil at all.

The farmer who wishes for a large crop of this corn, should not annoy it with running beans, or pumpions; the former, by winding round the stalks and ears, cramp them in their growth, and sometimes bend them down to the ground by their weight; the latter, by their luxuriant growth, rob the hills of much vegetable food, and by their thick shade, shut out the influence of the sun from the roots of the corn.

At the second and third hoeings, all the suckers should be buried under the soil; not broken off, as is the common practice, because this wounds the plants. If the suckers be suffered to grow, they seldom, or never produce fair and perfect ears; and they rob the ears on the main stalk of their nourishment. I mention the second and third hoeings, because the suckers will not all appear till the third; and the sooner they are destroyed the better the crop will be.

Instead of the common method of planting, if your land be rich, easy to till, and free from obstacles, I should think it would be best to plant the corn in the drill method, the rows being of the same distance as in the common way, placing the corns about five inches asunder. I have found by experiment, that a greater quantity of corn may be produced in this method, than in hills; and the labour is but little, if at all, increased. In a small field where the dung had been evenly spread, and ploughed in, I planted one row thus, the rest being in the common way; and it yielded at harvest, one eighth part more corn by measure than either of the two nearest rows, the corn being equally ripe and good.

When there is reason to apprehend that the ground will prove too moist for this crop, it will be advisable to plough it into narrow ridges, and seed each ridge with one or two rows, as shall be found

most convenient. Some of the finest crops that I have known, have been raised in this method.

When a season is at all wet, this would be the best culture in almost any soil, unless the very driest be excepted.

There is a kind of ridging, which would be very proper for this plant, not only on account of drying the soil but that the land may have an alternate resting, or fallowing between the rows. In the common method of plain ploughing, it commonly happens that a hill stands precisely in the place of a hill of the preceding year. When this is the case, the plants will receive less nourishment than if the hill had had a new situation. That each hill may always have this advantage, let a ridge be formed by two furrows, turning part of a row of hills on each side, so as to meet each other, in the last year's interval: then small ridges will be formed on which the rows should be planted. If dung be first spread over the ground, most of it will buried where it should be, in the bottom of the ridges. At the time of weeding, the remainder of the old hills may be turned towards the new rows. With such a mode of culture, land could not soon be exhausted, even by a successive cropping with maize. *N. England Farmer.*

The uses to which this INVALUABLE plant is applied in the U. States are well known. The articles of diet into which it enters as a component part, are various and important. Alone, it is served up in several forms, all of which are excellent. As a strong nourishing food for horses and swine, it is probably superior to any other grain. Many articles will *fatten* animals, but it is corn alone upon which we depend for obtaining that *solidity* in the fat and muscle which are so valuable in slaughtered animals. Experience proves that corn *broken* by a mill, will go one third further in feeding beasts, then when given whole. The stalks and blades of corn, if carefully stacked and cut, have been found by a gentleman (S. B. esq.) a superior food to oats, for his coach horses. By a powerful cutting box the stalks and blades were cut small, and given sometimes alone, and sometimes with oats, and were observed to increase the spirits and flesh of the animals in a very sensible manner. The reason is evident; the stalks, especially the two lower joints abound with sugar, and was extracted during our revolutionary war; and sugar is one of the most nutritious principles in nature. Considering the importance of the use of the stalks, it is truly melancholy to see acres covered with them in winter, in some parts, instead of having them housed for the cattle. In the Venician territory, according to the late DR. SCANDELLA, the blades of corn are pulled, dried, and given to cattle without injury to the crops of corn, and MR. BORDELY says, he stripped 150 hills of corn, and cut off the tops when the corn was not hard, without any difference being observed between the stalks so treated, and the rest of the field. Dr. S. also states, that corn is sown broad cast, upon highly manured places near the stable, and when it reaches its highest growth, and the tassels begin to wither, the stalks are cut down morning and evening, and given to the cattle in the stables. These facts may be useful to those who want fodder, and have

corn, but barley straw or hay, ought to be cut with green corn, or blades and tops, to prevent the beasts from becoming *hoven*. It has already been said that the *cobs* of corn are chopped fine by mills for cattle in Lancaster county.

The blades of corn make a good coarse paper, and may be a valuable substitute for rags, in a scarcity of that article. A more particular account of this subject will be given under the article PAPER.]

CORN-BERRIES, or Cranberries: See BILBERRY.

CORN-CALE. See CHARLOCK.

CORN-CHAFER, or *Curculio granarius*, L. a species of insects bearing a resemblance to oblong, soft worms. They are provided anteriorly with six scaly legs, and their head is likewise covered with scales. Some species of these larvae are dreaded for the mischief they do in granaries; as they find means to introduce themselves, while small, into grains of corn, and there fix their abode. It is very difficult to discover them, for they lie concealed within the grain, grow slowly, and enlarge their habitation, in proportion to their size, at the expence of the interior meal, on which they feed.

Corn-lofts are frequently laid waste by these numerous insects, which devour immense quantities of grain. When the corn-chafer, after having consumed all the meal, has attained its full size, it remains within the grain, hides itself under the empty husk, and subsists alone: there it undergoes its transformation, and becomes a chrysalis; nor does it leave the grain, till a perfect insect, when it makes its way through the husk.

One of our foreign correspondents has communicated to us the following recipe for extirpating these predatory vermin, or preventing their devastations in granaries: Take three or four handfuls of the purple loose-strife, or willow-herb, or grass-poly, *Lythrum Salicaria*, L. six or eight handfuls of water-pepper, or bitten snakeweed, *Polygonum Hydropiper*, L, and two handfuls of narrow-leaved pepper-wort or dittander, *Lepidium ruderale*, L....put them together in a capacious vessel filled with water, several inches above the herbs, and boil the whole from 15 to 30 minutes, by a moderate heat. After taking it from the fire, add four or six onions, a few cloves of garlick, and half a pound of Epsom salt. When cold, sprinkle the floor and walls of the granary with this decoction; and, if the former be constructed of clay, the sprinkling must be two or three times repeated. The herbs here employed, should not be gathered or decocted, till they are immediately wanted, as they would lose their efficacy by long keeping: hence, the months of June and July are the most proper seasons for collecting them. Lastly, the floor ought to be previously swept, and completely cleared of all impurities, so that the decoction may be applied as a preventive, in the months of August and September.

CORN-COCKLE, or *Agrostemma Githago*, L. is an indigenous, annual plant which grows in corn-fields, and bears purple flowers in the month of June or July. It is very prolific, and produces a great number of pods, each of which contains from twenty to thirty seed, somewhat resembling those of the turnip; they impart a strong taste and an unwholesome quality to the bread baked of corn mixed

with them: such grain ought, therefore, to be employed in distilleries, or the manufacture of starch.

There is a variety of this species, which produces similar, but smaller seeds than the former, and exhibits a peculiar mode of vegetation, being found within the wheat-ear, one side of which is filled with good grain, and the other with a spurious one, produced by this weed. Hence, husbandmen have given it the significant name of *ear-cockle*. It is by no means so common as the former variety, but is generally attributed to bad husbandry, by which the land is exhausted of its nutritious qualities, and weakened to such a degree as to be prevented from bringing the wheat to perfection; because this plant is never found on lands that are well cultivated, and properly managed. It is eaten by horses, goats, and sheep.

CORN-FLAG, the COMMON, or *Gladiolus communis*, L. a hardy, indigenous plant, growing in cornfields, from one to two feet high; producing red and white, or purple flowers, in May and June, which are succeeded by abundance of roundish seeds, in August.

The Common Corn-flag may be easily propagated by off-sets from the roots; as it prospers well in any soil or situation....The small, round, tuberous root is internally yellow, and reputed to be an excellent vulnerary; but this neglected vegetable is more important on account of its mealy nature. PLINY probably alludes to it, in the XXIst Book of his Natural History, where he observes, that the root has a sweet taste; and, when boiled, not only imparts to BREAD an agreeable flavour, but increases its weight. The blossoms of this plant supply bees with honey.

CORN-FLOWER. See BLUE-BOTTLE.

CORNEL-TREE, or *Cornus*, L. a genus of plants comprising twelve species, of which only two are indigenous.

1. The *sanguinea*, wild cornel-tree, or dog-wood, which is chiefly found in woods and hedges. It produces white flowers, which are in bloom in the month of June, and are succeeded by round berries. The wood of this species is hard and smooth, and is chiefly employed in turnery-ware. Its leaves change to a deep blood-colour in autumn. The berries are bitter, and dye purple: on account of their cooling and astringent nature, they are said to strengthen the stomach; stop fluxes of every kind, and to be very serviceable in fevers, especially if accompanied with a diarrhœa. From one bushel of the kernels of these berries, 16lb. of lamp-oil were obtained by expression. The plant is eaten by horses, sheep, and goats, but refused by cows.

2 The *suecica*, or dwarf cornel, which is found in mountainous situations, chiefly on the Cheviot-hills, in Northumberland; and in some parts of Yorkshire and Scotland. It is perennial, produces white blossoms, that appear in June or July, and are succeeded by red berries, which are eaten by the Swedes.

[Six species of the *Cornus* grow in Pennsylvania, and in various parts of the United States. The most useful are:

1 *C. Florida*, Dogwood, or Box-wood of the New-England states.

This is a useful shrub growing in al-

most every part of the United States. It flowers very early in the spring, and makes a fine appearance. The bark which possesses considerable astringency, furnishes us with a domestic medicine, and when used in infusion with black alder (*prinos verticillatus*,) or with the roots of the sasafras (*laurus sasafras*) or of tulip poplar tree (*liriodendron tulipifera*) forms an excellent remedy in intermittents. 2. *Cornus Sericea, red willow, rose willow, blue berried dogwood*; leaves ovate, feruginous, silky underneath; it grows about six feet high, with an upright, round, branched, gray stem; the shoots are of a beautiful red colour in winter, and are said to furnish our Indians with a red dye; the bunches of white flowers which come out in August and September, and grow at the extremity of every branch, give to this shrub a fine appearance. It grows in wet places, and is used as a substitute for the Peruvian bark, to which it is but little inferior, if not equal in virtue....A chemical analysis should be made of this valuable native production, by the medical gentlemen in the country during their leisure hours.]

Corn-rose. See Red Poppy.

CORN-SALAD, or Lamb's Lettuce, *Valeriana locusta*, L. is an annual indigenous plant growing in corn-fields, and producing white-reddish flowers from April to June. It is eaten by cattle, and its young leaves are cut and used in spring and autumn as a salad, being esteemed little inferior to young lettuce. Sheep and canary-birds are equally fond of this vegetable.

Corns, in surgery, are hard excrescences, consisting of indurations of the skin, which arise on the toes, and sometimes on the sides of the feet, where these are much exposed to the pressure of narrow shoes. By degrees, they extend farther down between the muscular fibres on those parts, and occasion extreme pain.

Various remedies have been suggested for the cure of corns, but their removal is always attended with considerable difficulty. A correspondent in the 63d vol. of the *Gentleman's Magazine* asserts, that after having been afflicted with corns for several years, he was perfectly relieved from them, by the application of brown paper moistened with spittle. It has also been recommended to wrap a clove of garlic in paper, and cover it with hot ashes till it becomes soft, when it should be applied to the parts affected, as warm as they can bear it. But the best cure for these painful excrescences, in our opinion, is to wear constantly easy shoes, to bathe the feet frequently in lukewarm water, in which a little sal ammoniac and pot-ashes have been dissolved, and to apply a plaster made of equal parts of gum galbanum, saffron, and camphor. By persevering in this treatment, the complaint may in a considerable degree be alleviated, and at length totally eradicated. But we cannot omit to caution those who are troubled with corns, never to cut or pierce them with any sharp or pointed instrument; as such imprudent attempts have often been productive of dangerous consequences. Nay, it should be remarked, that every application which is liable to occasion pain to the foot or toes, ought to be carefully guarded against, as being improper and unsafe. Hence the inefficacy of operations performed by

pretenders, who are unacquainted with the structure of the human body: and such expedients may be aptly compared to periodical blood-lettings, which benefit the operator, but impoverish the constitution of the biassed patient, whose fluids increase, but progressively become more watery.

[Corns, as observed by Dr. W. universally proceed from presure by *tight shoes* on some joint. ....The means of prevention are, therefore obvious, and within the reach of every one: but when corns have appeared, they must be carefully pared with a sharp penknife, so as not to draw blood, and covered with a plaster of diachylon.]

CORPULENCY, or obesity, in physiology, is the accumulation of too great a quantity of *fat* or animal oil, which distends the solids to an unnatural degree, by the abundance of granulated matter collected in the cellular membrane.

Corpulency arises from a variety of causes, which may operate separately, or conjointly in the same constitution. It may, however, be principally ascribed, 1. To the introduction of too much oil into the habit, through the channels of nourishment, by which means it is retained in too large a quantity. 2. An over-laxity, or, perhaps, too large a structure of the cells in which it is deposited, so as to admit and retain an immoderate proportion of unctuous matter; 3. To a peculiar disposition of the blood, which renders it liable to separate too easily from its oleaginous particles, and to admit of their being strained off too plentifully by the secretory vessels; or, lastly, to a defective evacuation or expulsion of oil already absorbed, separated from the blood, and deposited in its cells, instead of being discharged through the different emunctories of the body.

Obesity is promoted by whatever tends to soften the blood, and render it less sharp and saline; such as want of exercise and motion, an indolent life, indulgence in too much sleep, &c. It may be removed or prevented by the contrary causes, and particularly by the use of saline and acid food, and drink.

Castile soap has often been employed with success, and is strongly recommended in a discourse, "*On the Causes, Nature, and Cure of Corpulency*," by Dr. FLEMYNG, (8vo. 1s. 1760); who directs from one to four drams to be dissolved in a gill or more of soft water, and to be taken every night previously to going to repose.

[A disposition in the system to grow corpulent, is frequently observed to be unconnected with the quantity or quality of the aliment, or the proportion of exercise taken. The cause of this disposition is by no means understood: the female sex in the United States, are frequently distressed by their increase in size, and are too apt to take a variety of remedies to prevent the disagreeable circumstance. But the practice cannot be reprobated in too severe terms. All that can be done with propriety, is to diminish the quantity of animal food, confine the drink to *water*, and to take much exercise.]

COSMETIC, any medicine, or preparation, that renders the skin soft and white, or contributes to beautify the complexion.

Various articles have been obtruded on the public attention, by ignorant and speculative persons, as possessing every property that may

tend to improve the surface of the body, but which have generally been found to consist of the most hurtful metallic ingredients, such as the various preparations of lead, mercury, arsenic, &c. To those, however, whose decayed countenances seem to justify them in the use of cosmetics, or, who are determined to employ them, instead of attending to the more effectual means of preserving the bloom of their skin, it may perhaps be of service to point out two or three harmless external applications, chiefly with a view to prevent them from using dangerous and pernicious specifics.

According to the late Dr. WITHERING, an infusion of horse-radish in milk, makes one of the safest and best cosmetics.

Another preparation for clearing the skin of pimples and recent eruptions, if assisted by gentle aperient medicines, is the fresh expressed juice of house-leek, mixed with an equal quantity of sweet milk, or cream.

Professor PALLAS recommends the water distilled from flowers of the *Nymphæa Nelumbo*, [*Nelumbium Speciosum*, which see,] a plant indigenous in the Asiatic part of Russia, on the banks of the Volga; and which, by his account, imparts an agreeable softness and delicacy to the skin of the face and hands.

Frequent bathing will also contribute to the prolongation of youth, and preservation of the external integuments. To these remedies, we venture to add honey-water made to the consistence of cream, so that it may form a kind of varnish on the skin, which, especially when chapped by frost, will be much benefited by this application: and if it occasion any irritation or uneasiness, a little fine wheaten flour, or *pure* hair-powder, should be scattered on the hands or face.

Without exception, the best cosmetic, in our opinion, is *temperance*; as, by avoiding excesses of every kind, the body will retain its natural tone, the uniform circulation of all the fluids will be facilitated, and those disgraceful eruptions, we too frequently observe on the features of the younger part of the present generation, will be utterly effaced.

COSTIVENESS, in medicine, a retention of the excrements, accompanied with an unusual hardness and dryness, so as to render the evacuations difficult and sometimes painful.

Sedentary persons are peculiarly liable to this complaint, especially those of sanguineous and choleric temperaments; or who are subject to hypochondriac affections, the gout, acute fevers, and bilious disorders.

Costiveness is frequently occasioned by neglecting the usual time of going to stool, and checking the natural tendency to those salutary excretions; by an extraordinary heat of the body, and copious sweats; by taking into the stomach a larger proportion of solid food, than is proper for the quantity of fluids swallowed; and, lastly, by too frequent use of such nutriment as is dry, heating, and difficult of digestion....To those who are afflicted with this complaint, we would recommend to visit the customary retreat every morning, at a stated hour, and thus endeavour to promote the natural evacuation by moderate efforts; even though they may not perhaps be much inclined, and should not at first succeed; for experience has proved, that Nature will in this respect, by

perseverance, acquire a habit of regularity. The most proper time for that purpose, is either early in the morning, or late in the evening.

In many families costiveness is hereditary. It may also arise from a debilitated state of the intestinal canal, occasioned by diseases, but more frequently from the habitual use of lean meat, game, red port wine, strong malt liquors, and similar articles of food and drink. From whatever cause it may originate, continual exercise in the open air, and abstinence from heating or intoxicating liquors, will be found very beneficial.

In those cases, however, where inveterate costiveness has once taken place, and the usual simple remedies have proved abortive, *carbon*, or charcoal (divested of its oxygen by heat), has been administered with uncommon success. [By the late Dr. E. H. SMITH of New-York], who recommends two drams of carbon finely levigated, to be mixed with four ounces of lenitive electuary, and two drams of carbonat of soda. Of this mixture, from half an ounce to one, and even two ounces, may be taken twice, thrice, or oftener, in the course of the day, as circumstances may require.

[Persons subject to costiveness, should avoid drinking red wines, and eating *fresh bread*, which greatly disposes to costiveness, besides being highly uneconomical. The food ought to be well chewed, and soups abounding with vegetables should compose a part of every day's dinner. Bread composed of one-third Indian corn meal, and two-thirds wheat flour, and eaten the day after being baked, ought to be used. Rye bread is more laxative than wheat, and may be occasionally used. Stewed prunes and roasted apples are also gently laxative. Spinnach when properly dressed is a very pleasant vegetable, and gently laxative, and should be frequently eaten by costive persons. Those who ride much on horse-back, are disposed to costiveness, for which a draught of cold water in the morning is a good remedy. Molasses diluted with water, is a proper drink for costive habits. For medicine, the following may be taken occasionally. Flowers of sulphur, cream of tartar, each one oz. mix, and take a heaped tea-spoonful with molasses at night, when going to bed, and another in the morning. Persons have been known to be habitually costive, to have a quick pulse, loose their appetite, and the complexion to turn yellow in consequence of drinking water which flowed through leaden tubes, and even from the piston of a pump being made of lead. A case from the last cause occurred to the late Dr. WITHERING, of Birmingham; the person (a woman) always found herself better if she left her own house for any length of time, and was cured by changing her water.]

COTTAGE, properly signifies a small dwelling-house, independently of any lands attached to it....

According to WILLIAM MORTON PITT, Esq. the ingenious author of an *Address to the Landed Interest*; there are few parishes without several rough, encumbered, and uncultivated tracts, which might be converted into large gardens, and on which cottages might be built, either by the poor themselves, to be held on lives, or at the expence of the parish. If such habitations were more attainable by the poor, frugality would revive amongst them, and young people

would strive to lay up a sum of money for this purpose. The hope of improving their lot is the main-spring of industry, in all stations of life. The prosperity of this country has been attributed, not only to the spirit of enterprize of our merchants and manufacturers, but likewise to the effect, which the possession and security of property have on the minds of men.

The produce of a garden diminishes the consumption of bread, which is the most considerable article of a poor man's expenditure : it is an advantage wholly created by the cultivator's industry, at times when not otherwise engaged, as well as by that of his wife and children ; consequently there is so much labour gained to the community.

Every man who is averse to increase the wages of labour in husbandry, should at least encourage the culture of gardens. The quantity of land to be attached to such a cottage, might be half an acre, of inferior value, namely, about 10*s.* per acre. The corn in the gardens should be raised by dibbling ; a method already practised with success, in many parts of the kingdom. Where 10*s.* per acre is the value of the land, 5*s.* per annum might consequently be added as quit-rent: the fine on putting in a life, should not exceed one year's purchase computed on the real value. The cottager who builds a house upon this principle, acquires the following advantages : 1. A permanent property, as all improvements are for the benefit of himself and family ; 2. Respectability of situation ; 3. A diminution of annual expenditure ; and 4. That he cannot be dispossessed under any circumstances.

Mr. W. M. Pitt farther observes, that this arrangement will answer in all instances, where a labourer has money sufficient to enable him to build a cottage. But as this is not the case with many, the landlord may, without any risk, advance to any such industrious man 10*l.* or 15*l.* to enable him to erect a cottage, which would of itself be a security for the loan ; the money to be issued, in proportion only as the work advances. The cottager should pay interest at 5 per cent. and part of the principal, at least 10 per cent. every year. If he fail in making these payments, his effects should be liable. Thus, he would anticipate, with impatience, the time of discharging the whole debt, that he might enjoy the fruits of his labour, and a comfortable situation. The landlord would also be benefited, by being relieved from the expence of repairs, and especially by the reduction of the poor-rates ; he would receive his quit-rent annually, and a fine also, upon a renewal, in addition to the full rent of his land, as well as 5 per cent. interest on the money lent ; the whole debt being liquidated in ten years at farthest.

The utility of letting lands to the poor, at an easy rate, is still farther evinced in a letter from the Earl of Winchelsea to the Board of Agriculture, in 1796, from which we extract the following particulars......By the advantages arising from lands thus employed, the labourers and their families live better, and are consequently more able to endure fatigue. They are more comfortable, contented, and attached to their situation, while they acquire habits of industry and cleanliness, as well as a kind of in-

dependence, so that they set a higher value upon their character. The possession of a little property excites their industry: of this the noble Earl gives instances in the labourers on his estates in Rutlandshire; whose first thought, after they have obtained a cow, and land sufficient to maintain her, has been how to save money enough to purchase another, in consequence of which, application was made for an additional quantity of land. Such facts afford a complete refutation of the frivolous objections urged against this salutary measure; and we are happy to state from our own information, that when offers of this nature were made to industrious labourers, they have been unanimously accepted. We, therefore, sincerely recommend to the landholders of this country, to pursue a similar spirited conduct; and are of opinion, that it would act as an additional stimulus to the industry of the poor, if on the completion of any inclosure, a certain space of ground were allotted, for the grazing of their cows, during certain seasons of the year.

With respect to the most proper method of building cottages, and adapting them to different situations, for more wealthy families, we again recommend Mr. SOANE's "*Sketches in Architecture*" (vol. i. p. 100); and, for erecting the more humble habitations of the indigent and industrious, we believe Mr. MALTON's "*Essay on Cottage Architecture*" (large 4to. 1*l.* 11*s.* 6*d.*) will be found an useful guide. [See also FARM-HOUSE.]

COTTON, a soft downy substance; the production of the *gossypium*, L. or cotton tree, a genus of plants comprising twelve species, all of which are natives of warm climates, though four only are cultivated in fields to a very considerable extent. This plant is propagated by seeds, and when reared in Britain, requires to be kept in a hot-house, where it will produce both seeds and its peculiar down.

[In Georgia and South Carolina two kinds of cotton are planted, one of which grows upon the upland, is of a short staple, and has green seed. Another kind of a long staple and silky fineness, having black seed, is cultivated upon the islands on the coast of Georgia and South Carolina, the value of which has increased from two dollars per acre in a state of nature, to thirty, and in many instances, to 40 dollars per acre, within the last seven years. The salt air, and certain latitudes, (from 29 to 30 deg.) appear to be the chief cause of the great superiority of the Island Cotton over the upland, for the same soil a few miles off on *the fast land*, yet without saline air, cannot be made to produce cotton of equal quality.

The following mode of cultivating cotton is recommended by PIERCE BUTLER, Esq. who successfully plants that article on the island of St. Simons, state of Georgia.

"If the land has been recently cleared, or has long remained fallow, turn it up deep in winter; and in the first week in March bed it up in the following manner. Form 25 beds in 105 square feet of land, (being the space allotted to each able labourer for a day's work); this leaves about four feet, two and one half inches from the centre of one bed, to the centre of the next. The beds should be 3 feet wide, and flat in the middle. About the 15th of March, in the lat. of from 29 to 32°,

the cultivator should commence sowing, or as it is generally termed, planting. The seed should be well scattered in open trenches, made in the centre of the beds, and covered: the proportion of seed is one bushel to one acre; this allows for accidents occasioned by worms, or night chills. The cotton should be well weeded by hoes once every twelve days till blown, and even longer, if there is grass, observing to hoe up, that is *to* the cotton till it pods; and hoe down when the cotton is blown, in order to check the growth of the plant. From the proportion of seed mentioned, the cotton plants will come up plentifully, too much so, to suffer all to remain. They should be thinned moderately at each hoeing. When the plants have got strength and growth, which may be about the third hoeing, to disregard worms and bear drought; they should be thinned according to the fertility of the soil, from six inches to near two feet between the stocks or plants. In rich river grounds the beds should be from 5 to 6 feet apart, measuring from centre to centre; and the cotton plants, when out of the way of worms, from two to three feet apart. It is advisable to top cotton once or twice in rich low grounds, and also to remove the suckers. The latter end of July is generally considered a proper time for topping. *Gypsum* (plaster of Paris) may be used with success on cotton lands *not near the sea*. In river grounds, draining is proper; yet these lands should not be kept too dry. In tide lands, it is beneficial to let the water flow over the land, without retaining it. In river lands a change of crops is necessary. From actual experiment, it has been proved that river tide lands having, the preceding year had rice sown in them, yielded much more cotton the succeeding year than they would have afforded by a continuation of cotton.

The mere growing of cotton is but a part of the care of the planter; very much depends on classing and cleansing it for market, after it has been housed; sorting before it goes to the jennies, moating and removing any yellow particles are essential to assure a preference at a common market of competition."

The month of August in South Carolina and Georgia, is the season for commencing the business of picking cotton.

The quantity of black seed cotton produced on an acre of Georgia sea island is about 200 lbs.; in Carolina from 130 to 150 lbs.; an acre of upland will commonly produce 300 lbs. of green seed cotton.

The preparation of the ground for cotton is almost entirely effected by the hoe. The plough is scarcely used. This circumstance is the more to be wondered at, considering that the southern planters could not fail to see the great diminution of labour effected by that machine in the northern states; and that on land which has been long cultivated, it could be easily used.

After cotton land has been worked two or three years, it is permitted to rest one year, or more, to recruit. During this time, if a crop of the *Cassia Chamæcrista*, L. (Aquomac bean) already mentioned, were taken, much benefit to the soil would be produced: and it is recommended to the planters to try a comparative experiment upon a small scale to ascertain the point.

The cotton of the island of Bourbon ranks first in price at the Lon-

don market; that of the Georgia sea-island is the second; the cotton of Pernambucco third, and after these come that of the W. India and Levant, according to the attention given in preparing the article for a market. The Bombay, the green seed or upland cotton of the United States, and the Mississippi cotton are considered in the last class.

It is to be regretted that an abominable spirit of avarice has occasioned many instances of the most shameful deceptions in shipping our cotton to Europe. In some instances a bushel of seed has been found in the middle of a bale, and in other cases the fine cotton has been put over that of an inferior quality. This disgraceful conduct has occasioned loud and just complaints on the part of the British manufacturers, and has produced a general distrust with respect to most of the cotton shipped, which is highly injurious as well to the honest planter, as to the national character. A knowledge of these circumstances has induced some respectable planters, to mark their bales of cotton with their names, and by taking great pains to sort the various qualities, a degree of confidence has been annexed to their names, which is highly gratifying: so that when a sample of a particular bale is shewn, a purchase is made with the greatest certainty of finding the whole of the same quality. Every planter who feels a pride in having a good character attached to his name ought to follow the example above given; and to prevent the bad effects arising from the want of principle of dishonest men, inspectors should be appointed, who might have permission to examine every suspected bale, and to mark the quality of the article. The good effects of an inspection have been long since felt in Philadelphia, with regard to the articles flour, beef, pork, and tobacco.

Cotton has accomplished for the southern states, what clover and gypsum has for Pennsylvania..... The riches of both these have been greatly increased by these particular articles of culture; but with different degrees of rapidity. In 1794, cotton was of so little consequence, that it was not thought of by our negociator in the treaty with England! And yet, twenty-seven millions of pounds weight of American cotton, were exported from the United States to Europe, during the past year, 1802.

It appears, from a great number of facts, that a capacity to produce cotton, really exists in a very extensive portion of the United States. It begins in the southern counties of New-Jersey, and in the northern counties of Delaware, Maryland, and Virginia, and continues through the Carolinas, Georgia, Kentucky, and the Mississippi and Ohio territories. The southern line of Pennsylvania continued eastward and westward, seems to be the northern boundary of what may be called, *the cotton district of the United States.*

The facts, which prove the cotton to be easily produceable in the Delaware and Maryland counties of New-Castle, and Cæcil, are numerous, and it is well ascertained, that during the revolutionary war, cotton was cultivated by several families in Kent, on Delaware, in sufficient quantities to supply them with clothing. It has been raised also, without any uncommon care, in the borough of Wilmington, where it thrived, blossomed, and

yellowed in perfection. These facts prove, that much of Delaware is capable of producing cotton. The places, in every township and hundred, best adapted to it, are those where the effects of frost are usually the most moderate. This point merits particular attention in South-Jersey, Delaware and Maryland. It is understood, that frosts are less severe near to the Atlantic, and to our salt bays and rivers. It will of course grow equally well in the Jersey counties of Cape May, Cumberland, Salem, and part of Gloucester, and in the Maryland Harford county. The inducements to raise this clean, excellent and useful raw material in every part of our country, are manifest and great. By raising it on Delaware and Chesapeake bays, *manufactures* will *soonest* take place, *soonest* become extensive; and, *it is by manufactures that cotton must be supported in price.*

It is our policy to wear all kinds of cotton goods, in preference to those *imported* of wool, silk, flax, hemp, and leather.

In relation to this object, one measure is earnestly, but respectfully recommended to the governments of the union, and of the states. It is the introduction of the use of *cotton blankets*, by providing them for *the military*, by land and sea. It is also recommended to the planters and farmers from Delaware and Maryland to Georgia, and the Mississippi, to introduce the use of cotton blankets, rugs, coverlets, and carpets. It is in those large and heavy manufactures, that we can consume our cotton, and we see that the consumption of our cotton is an object of the utmost importance, even to our grain and grass farmers.... Let our planters order from the English, French, Dutch, or German merchants, cotton blankets, rugs, coverlets, and carpets, and other cotton goods, for the use of their families. Let specimens of these new cotton fabrics be placed before our eyes, by daily use, in order that we may learn to imitate them. Let the American cotton sacks be as famous, as the woollen sacks of Britain, at least in our eight southern states, and the Mississippi territory, and let the eight northern states consider well the vast advantages, which a certain and abundant supply of American cotton, with foreign and American capital, joined to foreign machinery and artists, seem to promise them. It is certainly a fact of immense and unobserved importance, that we have reached a production of cotton, manifold greater than all the British West-India colonies. The effects upon our internal industry and manufactures are the most promising possible, because it is the raw material, in the world, most capable of being worked by water mills and other labour-saving machinery, in this scarcely peopled, and well employed country.]

In June 1796, a patent was granted to Mr. Robert Miller, calico-printer, Dumbartonshire, Scotland, for a method of weaving all kinds of cotton, linen, and worsted-cloths, by means of looms worked by water; and which may be farther facilitated by steam-engines, horses, or any other power: the weaving is performed at considerably less expence, and more expeditiously, than it can be accomplished by the hands of weavers; the cloth thus woven is of a more regular texture, and superior to

that wrought by the hand. But, as this patent relates purely to a mechanical operation, solely calculated for manafacturers, we refer the reader to the 8th vol. of the *Repertory of Arts and Manufactures*.

Another patent was granted in April, 1790, to Mr. W. NICHOLSON, for his invention of a machine for printing on cotton, woollen, and other articles, in a more neat, cheap and accurate manner than is effected by the contrivances now in use. The leading principles of this invention, appear to consist of three particulars. 1. The manner of preparing the original models, casts, types, engravings, carvings, or sculptures from which the impression is to be made; 2. In applying the ink, or colouring matter to such models, &c.; 3. In taking off the impression, or transferring the ink, or colouring matter from those models, &c. to the paper, cloth, or other materials, upon which it is intended to remain. Those of our readers, who may wish farther to investigate this subject, will find an accurate and minute account in the 8th volume of the work last mentioned.

In July, 1801, a patent was granted to Mr. ANTHONY BOWDEN, for a new machine or engine designed to *bat*, or beat, and clean cotton. A mere description being inadequate to convey a distinct idea of Mr. B's contrivance, the inquisitive reader will consult the 16th vol. of the "*Repertory of Arts*," &c. where his specification is illustrated by an engraving......At present, we shall only remark, that the principle of this invention corresponds with that on which the other improved machinery of cotton-works is constructed: its chief merit consists in giving a new distribution of mechanical power, calculated to perform an operation, in preparing cotton for the manufacturer, which has hitherto been executed solely by human labour; and, as *two-thirds of the number* of labourers, consisting of children, instead of women or men in full strength, will thus be enabled to perform the same portion of work as formerly required a full complement of hands, such essential improvement deservedly claims attention.

The utility of cotton is not merely confined to the manufacture of different cloths: it is also capable of being converted into hats and paper. Experiments have shewn, that, if raw cotton be beaten to a sufficient degree, and then reduced to a proper pulp, it will produce a smooth, strong, white paper, little inferior in texture to that commonly made of linen rags. See PAPER.

[COTTON MANUFACTORY. When these United States were colonies of Great-Britain, it was the policy of that country to prevent us from manufacturing our own clothing; and the only thing that reconciled the ministry to a peace, was, the prospect of our becoming one of their best customers. The prejudices of Americans, who thought the country too young for manufacturing; and, that the arts, by introducing luxury, would also introduce vice, and wean them from that simplicity of manners which was believed, exclusively, to belong to the agricultural life; the predilection which nearly half the community, especially the rich, had for the mother country: and the influence, which the merchants have had in our councils: all *continued to prevent* the introduction of clothing manufactories into these states.

Time, however, and experience, have demonstrated, that luxury and vice may find their way into a country where manufacturing is discouraged; that, *by a spirit of traffic*, foreign luxuries are introduced; and a restless, migratory life, robs a nation of its innocence and simplicity. Years have weaned many from their attachment to England, and the intelligent part of the merchants perceive, that commerce would increase by multiplying and diversifying the objects of our industry. And, what is more, the general government, which has hitherto thought of nothing but revenue, are convinced that clothing and other useful manufacturies may be protected, as they are in England, without throwing down their idol revenue.

Under these impressions the editor thinks it his duty to lay before his readers such a view of the cotton manufactory, as is consistent with the plan of this work, and for which he is indebted to a friend who has a *practical* knowledge of the subject on which he writes.

Since the introduction of machinery into this manufactory, the power of establishing it, in any country, rests entirely with the government: and, in this country, with the general government; because it, alone, has the controul over the duties on importation. This will be made evident from the following considerations.

First, by reflecting on the advantages a nation must possess which has already established the cotton manufactory. *There* skilful workmen are collected together.... such as mill-wrights to erect the great gears; machine-makers.... turners, smiths, brass-founders, card-makers, spinners, weavers, loom-makers, reed-makers, bleechers, dyers, dressers, &c. all excellent in their kind....and the whole business being organized with so much system, they are enabled to work low, and still have good wages. For these trades are of a sociable disposition, and flourish best near each other. The capitalist can calculate to a fraction what will be the expence of his undertaking, and within a small trifle of the profits resulting therefrom.

But, secondly, if we reflect on the disadvantages a nation labours under where all those trades, and all that skill and organization, are to be created, and collected together; at what immense expence this is to be done; and how uncertain and precarious the result; it will naturally lead us to this obvious conclusion, That, in order to balance the situations of both countries, the *government* must lay protecting duties; and, where fashion is to be combated, a total prohibition is absolutely necessary. It is true, that an objection has been made, by some people, to prohibitory duties, as being illiberal, and unworthy the generous maxims of republicanism, without perceiving, that this is exactly the universal practice of mankind, and of those also who make this objection. You have been long accustomed to deal at a certain dry good store a few squares off, for many years, and have been uniformly treated well: but your own son sets up, in the same line of business, next door to yourself; will you say that it is ungenerous or illiberal to order your servant to purchase no longer at the old place? and will you not consider that, although your son charges a little higher, it is all in the family; and will answer the same end as enlarging his fortune?

The connection betwixt Great-Britain and the manufacturing part of India, has been very intimate for more than a hundred years.... Money, in that country, being very scarce, the inhabitants perform a great deal of labour for a small sum: hence the cotton muslins, chintzes, calicoes, &c. might have been imported into Great-Britain, and sold to the inhabitants much cheaper than it was possible to manufacture them there. Add to this that the Germans and French could always undersell the English in their own markets, by the difference in the value of specie, if the latter had not, by express statutes, protected their own manufactures..... And so far back as the reign of EDWARD the 4th, we find the English government giving encouragement to her manufacturies; for, by the statute 3. EDW. 4. c. 4. it is enacted that "no person shall bring "into the kingdom any of the goods, "wares, or things herein after men-"tioned, upon pain to forfeit the "same, as often as they may be "found in the hands of any person; "to be sold, half to the King and "half to the seizer, (viz.) woollen "cloths, laces, ribbands, fringes, "purses, gloves, &c. &c." and by the 1. RICHARD 3. c. 12. no merchant stranger shall bring or import into the realm any of the wares made and wrought pertaining to the crafts following, *i. e.* girdlers, point-makers, glovers, weavers, &c. At a time when there was no thought of spinning by the power of water, or by any kind of machinery; and when very little cotton was manufactured in England: in the reign of JAMES I. a duty of 10 per cent. was laid on all cotton goods, over and above what was paid by ancient statutes and customs; and in the reign of WILLIAM and MARY, 20 per cent. more; and afterwards an addition of 5 per cent. which, altogether was found hardly sufficient to keep out the East India cottons; a farther duty, therefore, was laid on, in the 12th. WILLIAM 3. and by a subsequent statute in the same reign, it was enacted, that "For the better employing the poor, by encouraging the manufacturies of this kingdom, all wrought silks, bengals, and stuffs of the manufacture of Persia, China, or E. India, and all calicoes painted, printed, dyed, or stained there, which shall be imported, shall not be worn here; but shall be entered and carried to warehouses, appointed by the commissioners of the customs, in order for exportation, and not taken thence, but on security that they shall be exported, which security is to be discharged upon certificates, or proof of their being landed abroad, &c. And any such goods mixed with others, or made up for sale, found in any place, (except the said warehouses) shall be forfeited and seized as prohibited and unaccustomed goods, and carried to the next custom-house, *and sold for exportation only*, whereof one-third part of the monies to go to the king, and the other two-third parts to the seizer, &c. Besides a forfeiture of 200*l*. on the person having, or selling the same."

It was thus, that free scope was given to the inventive genius and enterprizing spirit of Englishmen. It was thus, that a foundation for commerce was laid, by encouraging the arts.

Before the invention of machinery in the cotton manufactory, not more than a million pounds of cotton wool was imported annually into England: but, since that period

it has been every year increasing, so that according to *Grellier's View of the Manufactures of Great-Britain*, it amounted in the year 1799 to 35,689,000 lbs. and we are assured from other authentic sources of information that it now (1808) amounts to 40 millions. Although we have no reason to doubt the statement of Mr. GRELLIER as to the amount of the quantity imported, every person that understands the manufactory, must be convinced that he has greatly erred, both as to the average price of the raw material, and also as to the value of the goods when manufactured.

First, he states the cost of the cotton wool at 2*s*. 6*d*. sterling per pound, which is about 54 cents..... This is a great deal too high for the average price. The very best East-India, Brasil, or Sea-Island cotton, has not averaged more than that sum: and, it is well known, that large quantities of inferior kinds are used, the average price of which is not more than 25 cents per lb.; the average price, therefore, will be full high if it be stated at 33 cents. This would make the total value of cotton wool imported into England 13 millions, two hundred thousand dollars.

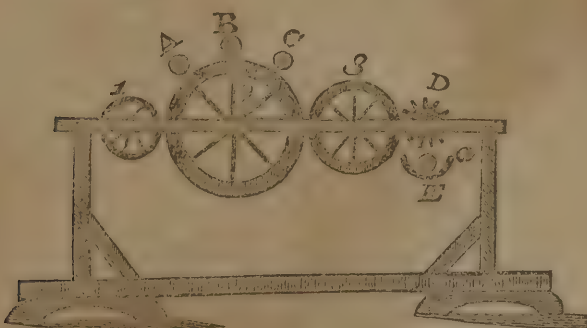
Mr. G. is equally erroneous in his calculations respecting the value of cotton in a manufactured state; he makes it only about 3 $\frac{2}{3}$ times the value of the raw material; whereas, if he had only been at the trouble to weigh the different kinds of cotton fabrics from the fine muslin to the strong corderoys, he would have found that 6lb of cotton would hardly purchase one pound of the heaviest manufactured article, even from the manufacturer, and before the profits are laid on by the merchant and retailer. And, in some of the fine muslins, fifty pounds of the raw material would not purchase one pound of the finished goods. We shall, therefore, be justified in stating the average multiple of the raw material at 8, and this makes a product of 265 million 600 thousand dollars, as the value of cotton goods manufactured in Great-Britain annually.

All the machinery used in the cotton manufactory have been invented in England, if we except the gin for cleaning the wool, which has been a long time used by the French in the West-India islands. Of late years it has been introduced with some alterations into the U. States, and claimed as a new invention. Another kind of gin has indeed been invented in the United States by Mr. MILLER, of Georgia, called the saw-gin, for ginning the green seed or upland cotton, which will not pass through the common roller gin. See GIN.

We believe it is not known who was the inventor of the cylindrical cards; but every subsequent improver on the art of spinning is indebted to him; for without this invention none of the other processes would have been practicable.

The first carding engines consisted of three cylinders about two feet long each, supported by the axis on a wooden frame on which they lay parallel, and almost touching each other. These were covered round with pieces of leather, full of card teeth. The first cylinder, about a foot in diameter, received the cotton, previously picked and cleaned; and turning slowly round, was received on the middle one, 3 feet in diameter, which moved with great velocity. On this cy-

linder it was carded by the rollers A, B, and C, cloathed also with cards, turning slowly round. The cotton thus carded was stripped from the middle cylinder by the doffing cylinder, 2 feet in diameter, and carried slowly round till it met with the wooden roller D, 3 inches in diameter, which instead of cards, had 9 or 10 pieces of tin, projecting edgewise from the roller, one edge of the tins being fixed in a sawgate made along the whole length of the rollers; as this roller turned round, the flat edges of the projecting tins brushed off the cotton from the cards, in long and broad fleaks, exactly the size of the pieces of leather-carding, nailed on the cylinder. These fleaks fell into the hollow demi-cylinder, whose end is represented at E, and was by another roller, rolled into a long, round, soft, *roving*, about the thickness of the finger and at the same time pushed over the edge *a*.



This Engine was put in motion by a winch fixed upon the centre of the main cylinder, and the motion communicated to the others by bands, which also regulated the relative velocity. This was the construction of the first carding engines; since which, several important improvements have been made, and sometimes alterations without any improvement whatever.

The roving as it fell from the cards, dropt into a basket, by which it was carried, without being incommoded, to the spinning machine, called a Jeanie. These jeanies were at first only constructed with from 10 to 20 spindles, about 3 inches apart, standing upright in a frame of wood, with sockets of brass for the bottom of the spindles to run in; each spindle had a separate band which went round a broad rimmed wheel that reclined on one side of the machine, at an angle of 45 degrees. This position of the wheel was best adapted for turning with the right hand, while the woman drew out the threads with her left. The rovings from which the threads were spun, were held between two pieces of wood of the same length with the frame which held the spindles. These pieces or bar of wood were supported at the ends upon carriages, with small trucks, which ran upon

two other bars of wood placed at right angles with the two ends of the spindle frame. When the woman turned the wheel with the right hand, she took hold of the centre of the two pieces which held the rovings with her left, and drawing towards herself, and from the points of the spindles, drew out a thread of between three and four feet in length, from three inches of the roving.

When the roving was well made from the cards, a beautiful and even thread was made in this way, and as fine as 30 hanks to the pound; or seven dozen cuts, reckoning by the Irish reel.

This machine was invented about the year, 1768, in Lancashire, and soon after introduced into Nottinghamshire, for the purpose of spinning stocking yarn.

No improvements were made on this machine, until about the year 1775. The manner of conducting the business of spinning at that period was thus: the man of capital, had a building suitable for his carding engines, which were driven by horses. He likewise had a number of Jeanies in proportion to the quanity of wool delivered from the cards. These Jeanies were let out to industrious women of the neighbourhood, who took them to their own homes; paid about ½ a guinea for learning to spin, and were supplied with work from the same person, who had furnished the Jeanie, at so much per pound. The yarn was then sold to another manufactory capitalist, who employed weavers to work it up into janes, fustians, corduroys, &c. As yet no fine muslin could be made in England, neither was the printing or dyeing of cotton, well understood. It is believed, that at this period, a good red upon cotton could not be made, either in printing, or dyeing in all England.

The improvements that have since been made upon the Jeanie, have taken that machine altogether from the women, who worked on them at home. When the machine was increased in size, by adding a number of spindles, even so many as 100, it became too large to be admitted into the houses of the working class.' The machine became more complex; for instead of a wheel, as above described, a long tin, or wooden cylinder, about five inches diameter, was contrived to run in a parallel line with the row of spindles, around which the bands were placed. A large wheel (at the side or end of the machine) whose axis was now horizontal was still necessary; and as the operator could not stretch out the left hand to the centre of the machine, and turn the wheel at the same time, contrivances were necessary to bring the handle which turned the wheel, nearer the centre.

When the number of spindles were increased, another improvement presented itself, or rather became necessary. The shortness of the rovings which could not be more than between two or three feet, viz. the length of the cylinders belonging to the carding engine, rendered it necessary, that the Jeanie should stand still half the time, while the operator joined the rovings. This lost time was not so much perceived, when there were not more than twenty spindles.

Another machine was, therefore, invented, which was called a Billy, by which a young boy or girl could join the roving. And, to preserve them from breaking,

they received on this machine, a slight twist to enable them to be wound on a cop.

A frame must now be attached to the Jeanie, to hold these cops. The whole machinery at last became so complex, and being carried on in manufacturing buildings, that it was necessary for men and boys, to perform the whole operation, and women were in a great measure driven from the employment.

In the mean while, the attention of practical mechanics was turned to still greater improvements. It was evident, that in order to make the thread of a closer texture, stronger, and still more equal in its size, it would be necessary to lay the fibres of the cotton wool longitudinally, or to lie along the length of the yarn; whereas, by the Jeanie spinning, the fibre necessarily goes round the roving, and consequently, cannot be laid even, in spinning. This, however, had been the mode of spinning in England, even when a single thread only was spun from time immemorial. It seems to have been taken from the mode of spinning short sheep's wool, which cotton very much resembles: but the same reason which induces the manufacturer to spin sheep's wool in that manner, does not hold good with respect to cotton. In the former, it is done with an intention of entangling and confusing the fibres, that it may *full* more readily; but as cotton will not *full*, every confusion or derangement of the fibres, weakens the thread, and consequently, the fabric of which it is made.

Richard Arkwright, therefore, for this and other reasons, which shall be noticed in course, invented the method of taking the roving from the cards, so as that all the fibres should lie in parallel lines along the length of the roving. This he accomplished, by an alteration in the manner of putting on the cards upon the *doffing* cylinder. Previous to his invention, the cards, with which the cylinders were covered, were in pieces of an oblong form, about six inches in breadth, and nearly as long as the cylinder. There was necessarily, a space between each piece, where there were no wires or teeth, and this made a separation in the roving. To avoid this, Mr. Arkwright cloathed the *doffing* cylinder with one long piece of card, about two inches in width, and wound it round, spiral-wise, the whole length of the cylinder, fastening it firmly at the ends with small tacks. These are now called fillet cards. It is not unworthy of observation, that when he obtained a patent for his inventions, he never specified this contrivance, and it was on that account, that his patent was laid open, after having gained several trials, in which this error had not been noticed.

Besides this fault of not laying the fibres parallel, there is another fundamental error, in Jeanie spinning, which will always prevent the equality of the yarn. It is this, three or four inches of the roving is submitted to the draught at one time, whereby, some parts will be drawn finer than others; and it universally holds good, that if there be an inequality in the roving, that inequality will be always increased by this mode of spinning. For, wherever the roving is finest, by being of course weaker, it will draw finer; and wherever it is coarsest, there it

will be drawn least, and, consequently, remain coarser. But this was entirely obviated, by making the roving pass through two pair of rollers. The front pair moving faster than the back pair, draws the roving finer in proportion to the difference of velocity; and, as the rollers are not much farther distant than the length of the fibres of the cotton, the draught must be perfectly equal on every part of the roving, and produce a thread as perfect as wire, that is well drawn.

Another advantage gained by Mr. ARKWRIGHT, by these two inventions, was, that the whole process of spinning was capable of being put in motion by the power of horses, water, steam, &c. but for this purpose, he found it necessary, to use a fly, or heck (as it is called in some places) upon the spindle, after the manner of flax or combed wool spinning; a contrivance, which twists and takes up the thread upon the bobbin (or spool) at the same time.

Before Mr. ARKWRIGHT had produced to the world a single thread spun in this manner, he had borrowed and expended upwards of 20,000l. sterling. He was himself a man of no property. We have heard it often repeated at Nottingham, the town where he erected his first machinery, that when he had drawn 18,000l. from WRIGHT, the banker, and still requested more, Mr. WRIGHT seemed impatient and doubtful of his success, wishing, at the same time, that he had nothing to do with it, and hoped he would get somebody else to take it off his hands. ARKWRIGHT, who was, by that time, perfectly certain, took him at his word, entered into a partnership with Mr. NEEDS, a reputable hosier of that town, who gave him a check upon WRIGHT's bank for the money. In a few years after, Mr. NEEDS retired from business with a princely fortune; for over and above the great profits derived from spinning, he had a monopoly of the yarn to supply his stocking manufactory, which so far excelled in quality the fabrics of any other person, that he could sell more than he could make.

Before we proceed to give an account of further improvements or inventions, we shall enumerate the different processes through which the cotton passes upon ARKWRIGHT's plan. The first moving power of the machinery, is either steam or water. Horses are generally laid aside. The buildings are made to contain from 500 to 1000 spindles. As Mr. ARKWRIGHT purchased none but good, clean cotton, there was no necessity for gins, or any machinery to clean the cotton. It was given out to women, to bat and pick out what little dirt was in it, preparatory to its going to the cards. He used two sets of cards, a coarser kind to open it well, and from which it was taken without the trouble of putting it into a roving. The second cards are each attended by a boy to feed, and remove the slivers. These are carried in tin cans to the drawing frame. Three of these slivers being united are passed through rollers, which not only unite them in one, but draw them, perhaps, six times finer or smaller, than they were before; these are again united by threes and passed through another pair of rollers, and drawn in like manner as before: this ope-

ration is performed three or four times, doubling the slivers and drawing them, till at last it comes through the rollers like a fine cob-web (the fibres all lying straight and parallel) about an inch broad: it then receives a gentle twist, to enable it to be wound upon a stick about 8 inches long, and $\frac{1}{2}$ an inch diameter. It is then called a roving.

By these repeated drawings and doublings, it is impossible but it must be perfectly even. The manner of giving the sliver a gentle twist without breaking, or in the least incommoding it, we are told, was the most difficult part of Mr. ARKWRIGHT's invention....Indeed, it would be impossible to discover the method of doing it by reflecting *a priori* on the nature of the thing: it must have been discovered only by patience and numerous experiments. The difficulties that he found, however, are evident from the complexity of his apparatus for that purpose. The roving *Can* (as it is called) is now much simplified. It is a tin box, about a foot in length, and six or seven inches diameter fixed on an upright spindle. As the sliver comes through the rollers, in the thin cobweb like manner above described, it falls into the can, which whirling rapidly round, gives it a gentle twist, and coils it neatly up in the inside, until the can is nearly full, when it is taken out by a door on the side, made to open and shut for the purpose. Such a coil may be pressed together and packed up in boxes, without being injured. A boy then winds them on the bobbins or sticks before mentioned, as they are wanted for the spinning frames.

Each spinning frame upon ARKWRIGHT's plan, contains about 42 spindles on each side, which are about as many as a steady girl can attend. Her business is to piece the threads as they break; to take off the spools as they are full, and put on empty ones; to take the roving bobbins when empty, and supply their place with full ones; to keep the frame clean and well oiled. If the yarn is to be doubled for stockings, there is generally a doubling and twisting machinery in the same building; but if it be intended for the weaver, then it is reeled, and is then fit for sale, or for dyeing, or bleaching.... Mr. ELTENHEAD charges for one frame of 84 spindles, to go by water, 500 dollars.

When the manufacturers speak of yarn spun in this manner, it is generally called water twist, or water spinning, in contradistinction to Jeanie spinning, which has been already mentioned, or Mule spinning, which yet remains to be described.

Mr. ARKWRIGHT brought this mode of spinning to perfection in the year 1774, and it is easy to be shewn, that the nation gained more by it, than was lost by the contest with America. It was to England a mine of wealth, a rich harvest which she was reaping without the knowledge of her enemies or friends; nay, the government itself was ignorant for several years of the cause of the national prosperity. When it was found out, about twelve years afterwards, RICHARD ARKWRIGHT was made a knight and sheriff of the county of Derby. Just before that, the Scots discovered the mine also; and from that period, Scotland has displayed more enterprize than ever she did before. Ireland, it is believed, was last in this race of wealth. The

wretched government of that country, has prevented the people from attending to their true interests.

Such were the fortunes gained in a short time by ARKWRIGHT's new mode of spinning, that every man of genius bent his mind to new improvements and inventions. And when strength and evenness of texture was already attained, the next thing wanted was fineness. People were no longer contented with 50 or 60 hanks to the lb. a thing once thought almost impossible. It must be still finer. But it was found, that upon ARKWRIGHT's principle, viz. (with a fly upon the spindle) it was very difficult to spin finer than 50 hanks. The thread was liable to break by the rapid motion of the fly when such yarn was attempted. Some genius, whose name has not been transmitted to us, hit upon the happy expedient of uniting in one machine the advantages of the Jeanie spinning, which draws out the thread from the end of the spindle....twists it, and then winds it upon the spindle, without a fly.... with the two most excellent properties of ARKWRIGHT's invention, the continued sliver with the fibres longitudinally, and the rollers. This machine, as partaking of the nature or principles of two machines, was called a mule. It is probable, that it was invented by several ingenious mechanics, who communicated to each other their ideas, freely, on the subject; since no patent was ever taken out for it, though the inventor or inventors certainly deserved it more than hundreds to whom patents have been granted. It has answered the most sanguine expectations, as upwards of 300 hanks of yarn have been spun on it from one pound of cotton.

At first, the number of spindles were eighty or an hundred: they are now made to carry 250; and, to compleat the whole, they have been made, within these few years, to be turned by water. When this is intended, two mules are set face to face: when the wheel of one mule is turned to draw out the threads, the person who attends them, is putting up, or winding up the threads on the other; and so on, alternately....So that, one skillful person, with the assistance of a girl, to piece the threads as they break, may attend 500 spindles, and each spindle will spin one hank per day.

Although this machine will not altogether supersede those with a fly on the spindle; they are nevertheless, the machines best adapted for America, in the present state of things. We have millseats in abundance upon all our waters. If the proprietor of a millseat would give a long lease of it, say fifty years, at a very low rent, to a person well skilled in the machinery, the rest of his land would increase in value by the population which would soon grow round it. In the southern states, the farmers might grow their own cotton, send it to the mill to be prepared, that is to say, *carded*, *drawn*, and *roved*, upon machinery constructed on ARKWRIGHT's principles. It might then be spun at home upon small mules of about fifty spindles, which would stand in a space of eight feet square: on such a mule, 50 hanks might easily be spun in one day. The proper size of yarn for domestic purposes, is that from 13 to 24 hanks in the pound. If

we suppose the price of preparing equal to the price of the cotton-wool, and the price of spinning the same, it is evident that the raw material is trebled in value. If it be wove into janes, corduroys, &c. for common household wear, the value will again be doubled, which then makes the manufactured goods six times the value of the cotton. In this calculation, we have only in view the coarsest articles: but, if the wool be of an excellent quality, the labour employed upon it, to bring it to cloathing, will be much more valuable. We may estimate the expence upon the smallest scale, nearly as follows:

Two carding engines, 400 dols. each, ...	800 00
One drawing frame, with wooden rollers, ...	50 00
One roving frame, do. . .	60 00
	$ 910 00

This machinery to go by water, would produce as much roving, as would supply 20 mules of 50 spindles each; which, if made with wooden rollers would cost from 75 to 100 dols. each.

Mr. ELTENHEAD, of Philadelphia, has offered to make the above machinery at the following prices, viz.

	Dols.
A carding engine, compleat, for	400
A drawing and roving frame, (supposed to be with iron rollers)	200
And a mule of 144 spindles, for	300

This last is also supposed to be with iron rollers, which, though no better than wood, would be certainly a greater expence. His calculation is also made on mules of a large size, fit only to be placed in large buildings, erected for the purpose: our calculation is on small mules, to spin for family use: nevertheless, in a short time, when habits of industry were acquired, a surplus would be produced, which it would be necessary to convey to the seaports for sale, and this also would require a mercantile capital, difficult in the present state of things to be created; and if it were, it is evident that this surplus of home manufactured goods, equal no doubt in strength and durability, to any imported; yet inferior as to shew, colouring, and finish, might as well be taken to the middle of a wilderness, and exposed to bears and wolves, as to the fashionable beaux and belles of the city, accustomed as they are, to the high finished goods of Europe and the East-Indies.

It will be therefore time enough for the capitalist, to engage in an extensive manufactory of goods, fit for the consumption of the cities and large sea-port towns of America, when the legislature shall think proper to protect him in his undertaking, by imitating the example of England, already mentioned. Such a person will also know, that he ought to choose for his situation, one of the largest inland towns: and that habits of industry and a steady price for labour are not to be met with in seaports. He will also avoid having his work performed by slaves: they seldom give their minds so much to reflection, as to become men of genius: and some genius is absolutely necessary to understand, and, keep in order, such a complication of machinery. This extensive plan

will best suit the middle and New-England states.

Without a great number of expensive engravings, it would be impossible to give a much better description of the machinery, than is here given. It would, however, be a desirable thing, that a work of that kind should be published, illustrated with engravings, and the accurate dimensions given of the different parts of the machinery. But the learned, who have leisure to attend to such pursuits, are (however paradoxical it may appear) totally ignorant of these things.... They have been almost always too much taken up with the invisible world, to attend to things substantial. The properties of an invisible gas, is much more diverting, than carding or roving engines. For this reason, it is not probable, that any such work will be undertaken; and our only consolation is, that the few artists in that line, which remain in the country, will very soon be employed to advantage.]

ALNEY *and* BROWN'S *prices of cotton yarn.*

No. of Hanks.	*Cents per Pound.*
10	88
11	91
12	94
13	98
14	102
15	106
16	110
17	114
18	118
19	122
20	126
21	130
22	134
23	138
24	142
25	146
30	166

COTTON-GRASS, or *Eriophorum*, L. is a perennial, native genus of plants, consisting of five species, the principal of which are the following:

1. The *angustifolium*, or common cotton-grass, moor-grass, moss-crops, or many-headed cotton-grass. It is found chiefly on marshes and bogs in the county of Stafford, on Birmingham-heath, and near New-port, Shropshire....In the Island of Skye, in Scotland, this plant is useful to support cattle in the earlier part of the spring, before the other grasses are sufficiently grown. The poorer class of people stuff their pillows with the woolly down of this plant, and also employ it in making wicks for candles.

2. The *Polystachion*, or broad-leaved cotton-grass, which grows in the marshy parts of the counties of Northampton; Bedford, near Dunstable; York, Cumberland; and very common in Scotland.

Large tracts of ground are sometimes covered with the white downy fibres of this plant, which flowers from April to June; and subsequently represents the snowy field of winter: its presence, however, indicates a soil productive of *turf*, or peat. Neither cattle nor sheep relish this vegetable, the hairy seed-vessels of which vitiate the hay, insomuch that large conglobate masses have often been found in the stomachs of animals, that died in consequence of feeding on such provender.

Hence the necessity of collecting the down of the broad-leaved cotton-grass, both for preventing the injurious consequences to cattle, and converting it to the following useful purposes. The late Dr. GLEDITSCH, of Berlin, made a variety of curious experiments with

this woolly substance; and found, that in combination with either sheep's wool, or cotton, it could be spun into a very strong and uniform yarn, from which were produced durable gloves, stockings, stuffs, and excellent cloth. He admits, however, that this downy material is more brittle than the fibrous integuments in which the seeds of the sweet, or bay-leaved willow, are enveloped. Nevertheless, we have recently had an opportunity of ascertaining, and think it our duty to announce it to the public, as a *fact* worthy the attention of manufacturers, that both substances before-mentioned, may be prepared by a simple chemical process, in such a manner as to render them eminently fit for being mixed with *improved* animal *wool*, as well as *cotton* and *silk*, nay, even the refuse of *flax* and *hemp*. Clothiers, serge and stocking makers, hatters, and all other artisans employed in this branch of staple manufactures, may perhaps find it their interest to obtain farther information on this important subject.

Couch-grass, or Couch-wheat: See Dog-grass.

COUGH, a violent, often involuntary, and sonorous expiration, suddenly expelling the air through the contracted glottis. It is excited by any acrid substance, either chemically or mechanically applied to those passages through which the air enters. These are lined with a membrane so exceedingly sensible, that it cannot bear the mildest stimulus, such as a drop of cold water, without throwing the muscles serving for respiration, into a violent convulsion. Hence the air is expelled with a force sufficient to carry along with it the irritating substance; and thus a cough becomes not only useful, but indispensibly necessary for the preservation of life; as this effort frees the lungs from every kind of stimulating matter, or foulness, which might otherwise be attended with suffocation. A cough is, therefore, an almost inseparable companion of every inflammation of the lungs, as well as every difficulty of breathing; nay, it frequently takes place, when the purest air enters an excoriated, sore, or too sensible windpipe, and its tender branches. It may arise from too great an irritability of the nervous system, or even of some particular part, such as the ear; from worms and impurities in the first passages; obstructions of the abdominal viscera; acrimony clogging the glands, and originating frequently from a catarrhal and scrophulous disposition; hysteric weakness; accumulation of sharp humours in the lungs, &c.

From this view of the causes which produce coughs, it will not be expected that we should expatiate on the treatment of the complaint, under every form and variety of circumstances; we shall, therefore, consider it under the following heads.

I. The *convulsive cough of infants*, in general, proceeds from a foul and disordered stomach, in consequence of too viscid and superfluous food, such as porridge, puddings, cakes, gingerbread, confectionary, &c. It is accompanied either with a voracious appetite, or a total want of it; difficulty of breathing, a tumefied hard belly: nausea, and often vomiting. The breath and excrements of such children are unusually fetid; they seldom cough from the breast, but make efforts to vomit, and throw up

a viscid phlegm; in consequence of which, they remain easy for a longer time than usual. Their tongue is always impure, and the cough increases in violence, after meals.

For the cure of this troublesome complaint, there are no better remedies than gentle emetics, and laxatives. A child under one year old, may occasionally take a large tea-spoonful, of this mixture namely, syrup of squills and rose-water, of each one ounce; powdered rhubarb, four grains; and ipecacuanha, two grains. The dose may be repeated every half hour, for three or four times, till it produces vomiting; and, in children two or three years of age, it may be somewhat increased, but never to exceed a dessert-spoonful. After the medicine has operated, a clyster, composed of milk and water, with a little oil and sugar, ought to be given, and repeated every other, or third day, while a sparing diet should be strictly observed.

II. The *convulsive cough of adults*, likewise arises from the disordered organs of digestion, and is frequently the constant lot of tipplers in spirituous liquors, and habitual drunkards. At its commencement there is little or no expectoration; and an inclination to vomit generally precedes a fit of coughing.....The treatment of this malady is similar to that of the same species in children; but, if the paroxysms should be so severe as to threaten suffocation, we advise, from experience, small doses of calcined zinc, from half a grain to one grain at a time, to be taken in a spoonful of luke-warm water, and to be repeated, if necessary, every five or ten minutes.

III. The *catarrhal cough*, which is the most common, and very frequent, especially in the winter season: See Catarrh. Its immediate cause is a defluxion of humours from the salival glands, chiefly on the trachea or windpipe; thus irritating the throat, and producing fits of coughing. The continuance of such efforts to expel superfluous matter, generates another cause of the complaint; for, when this humour glides down into the air-vessels of the lungs, it fills many of their cavities, and becomes, in a manner, inspissated, by the continual exhalation of its minutest parts in respiration. The salival humour, thus thickened, by the joint action of the lungs and the air in breathing, is occasionally raised and brought into the mouth, so that in its passages it excites a fit of coughing. In this situation, especially after *catching cold*, and, with a view to prevent, rather than to cure, a catarrhal cough, the late Dr. Lobb suggested a remedy, which simply consists in chewing any kind of *dry* aliment. As the action of the muscles, in mastication, excites the salival glands, and all other adjacent glandules, to discharge their contained humour, and to mix it with dry food, before it is conveyed to the stomach, where it cannot fail to promote digestion, he concludes that, in this manner, a much smaller quantity of the salival humour will fall into the air-vessels of the lungs, and thus the proximate cause of the cough be gradually counteracted. Hence Dr. Lobb advised his patients to use biscuits of all sorts, though hard bread or crust will answer the same purpose: 1. To eat some mouthfuls of dry food previously to

going to bed, which often prevents those fits of coughing that otherwise would disturb their sleep..... 2. To resort to the same remedy in the morning, when it will convey the salival humour into the stomach. 3. To repeat it every time during the day, when, by a *tickling* in the throat, they apprehend the approach of a fit of coughing. By such practices, he observes great benefit has been derived by himself and others. We are, however, inclined to think, that it will be useful only at the commencement of the complaint. And the Doctor likewise adds, that to a patient long afflicted with it, totally deprived of his appetite, and perhaps sunk down into a consumption, it is not so effectual, though always of some service. Those who cannot possibly swallow any kind of solid food, he advises, at least, to chew dry aliment, at the times before specified, and again to part with it: this expedient will considerably lessen the quantity of salival humour, and thus prevent, or shorten, many fits of coughing.

It is a common error, that *all* coughs may be cured by the usual mode of administering oily, diluent, and demulcent remedies. At first, indeed, such medicines may be serviceable, to sweeten the acrid humours then secreted, and to allay the irritation. But, as the compounds of oil, spermaceti, &c. easily turn rancid, and even in a fresh state impair the appetite, and affect the breast, we consider them as extremely precarious: hence we would prefer the chewing of the extract of liquorice, gum arabic, and similar substances, to all *liquid* preparations. If, however, the cough has made such progress, as not to yield to the treatment here alluded to, in this case we can confidently recommend the use of the following acid julep: Three ounces of sweet olive oil, two ounces of syrup of capillaire, one ounce of conserve of roses, and thirty drops of strong oil of vitriol; mix them properly, and take a tea-spoonful or two, frequently. These ingredients form an excellent medicine for adults; but, for children, we would prefer a julep prepared of eight ounces of rose-water, four ounces of syrup of dry roses, and six drops of vitriolic acid; to be taken by spoonfuls, as often as occasion may require, especially if the cough be accompanied with thirst and febrile heat. In the latter cases, the julep should be diluted with sweet whey, which of itself is an incomparable beverage in catarrhal affections.

Lastly, we cannot omit to insert in this place, a remedy which is highly praised by the late Dr. Unzer, of Hamburgh, and the physicians of that city, as being of inestimable value in all obstinate catarrhs, stagnations, and accumulations of humours in the breast; *dry coughs*; and severe bruises near the pectoral vessels, from which suppurations and ulcers may be apprehended. This medicine is a simple decoction of the Calaguala, a root lately imported from South America, and now universally preferred to the seneka or rattle-snake root, which were formerly used for similar purposes. Dr. Unzer directs two drams of the calaguala to be boiled in a quart of water, till the fourth part is evaporated, and to drink several cups of the strained decoction, instead of tea. When taken sufficiently strong, and for a proper length of

time, it evidently acts on the skin and kidnies, by determining the humours to those outlets. He cautions, however, against a spurious species of that root, which is frequently sold by druggists, instead of the genuine; and an account of which is given by M. Galmetti, an Italian writer.

We have thus enlarged on the subject, because long-continued coughs generally lay the foundation of consumptive and other disorders, which annually deprive the community of thousands, whose lives might be easily preserved, if they had not neglected the *first* attack.

Cough, *in farriery*, a disease to which horses are very subject. When injudiciously treated, it is sometimes of long duration; occasions loss of appetite, wasting of the flesh, and, ultimately, consumption. Of this malady there are two principal species: the one is loose, almost continual, and increases to a violent degree, upon the least motion; the other is short and dry, being preceded by a husky, hollow kind of wheezing, apparently arising from obstructed breathing, by the retention of fragments of hay, or corn, in the passage. The latter is usually called an *asthma*, for which mercurial purges are recommended;....the animal should first be bled repeatedly, and in small quantities, till the inflammation and irritability of the glands are allayed; and the blood so attenuated by the constant use of nitre, as to facilitate the circulation through the finer vessels of the lungs. This operation being performed, a ball consisting of the following ingredients should be given, according to Mr. Taplin, every morning, for a fortnight or three weeks.

Detergent pectoral balls: Take of castile soap, aniseed, and liquorice powder, each 5 oz. Barbadoes tar 6 oz. gum ammoniacum 3 oz. balsam of Tolu 1 oz. and honey sufficient to make a mass; which must be divided into twelve balls. ....Should the animal not recover from this course, he must be again bled, and treated with mercurials.

With respect to the long, loud, incessant, hollow cough, which increases on the least hurry in exercise, the first step is blood-letting; then a mash should be given, consisting of equal parts of bran and oats, into which, while hot, 4 oz. of honey and 2 oz. of nitre, must be stirred and dissolved. This mash must be repeated, without intermission, every night and morning, and a ball prepared of Turkey figs, Spanish liquorice, aniseed, and liquorice-powder, each 4 oz.; carraway-seeds, elecampane and anisitated balsam, each 2 oz.; saffron, ground ginger, and oil of aniseed, each 6 drams; and the requisite proportion of honey to form the whole into a paste, which should be divided into twelve balls, one of which is to be given every morning.

These balls, says Mr. Taplin, are powerful, cordial, and restorative; they promote glandular excretion, warm and stimulate the stomach to an expulsion of wind: enliven the circulation, and invigorate the whole frame. It will, perhaps, be useful to observe, that some young horses are subject to coughs, when cutting their teeth; in such case, it is necessary to bleed and give them warm mashes, which in general, will effectually remove the disorder.

Cough, *in cattle*, a disease called the *husk*, to which young bullocks

are liable. In this dangerous affection, the wind-pipe and its branches are obstructed with small taper worms. It is by farmers generally considered as incurable, though we are of opinion, that fumigations with cinnabar, or with fetid substances, such as tobacco, hartshorn shavings, feathers, &c. might occasionally prove of service, especially if they be cautiously administered by means of clysters.

Calves are liable to take frequent colds, especially if they be exposed to the vicissitudes of the weather, before they acquire sufficient strength to undergo the changes of this climate: the consequence is a *cough*, that frequently proves fatal, if it be neglected. For curing this malady, the following recipe is given in the "*Cardiganshire Landlord's Advice to his Tenants*;" Bristol, 1800: Let half a table-spoonful of spirit of turpentine be poured into the animal's nostrils, which must be held upwards, in order that the liquor may flow into the throat: at the same time, the nose ought to be smeared with tar, and the calf be kept in the house for a few hours: this treatment should be repeated as often as the cough is troublesome.

COUHAGE, or cow-itch, as it is erroneously called, *Dolichos pruriens*, L. is an exotic plant, growing in warm climates, especially in the West-Indies. It produces crooked, leguminous, coriaceous pods, thickly set with spiculæ, or sharp hairs, which penetrate the skin, and cause a violent itching. These spiculæ are used in South America [and West Indies] in cases of worms, and have lately been employed in Britain for the same purpose: all the hairy part of one pod, mixed with syrup, or treacle, and taken in the morning fasting, is prescribed as a dose for an adult. The worms are said to appear after taking the second or third dose; and, by means of a brisk laxative, the stools are reported, in some cases, to have consisted almost entirely of worms. Although no inconvenience appears to arise from the internal use of this medicine, we doubt its virtues as a vermifuge.

[The vermifuge powers of the *Dolichos pruriens*, couhage, or horse-eye bean; cannot be doubted. A decoction of the roots is esteemed a powerful diuretic, and a vinous infusion of the pods (twelve to a quart) is said to be a certain remedy for the dropsy: the dose half a pint, when made into beer.]

COUNTRY-HOUSES, are those erected in the country, for the use and convenience of private individuals, as opposed to the splendid villas and mansions of the nobility, and more opulent gentry.

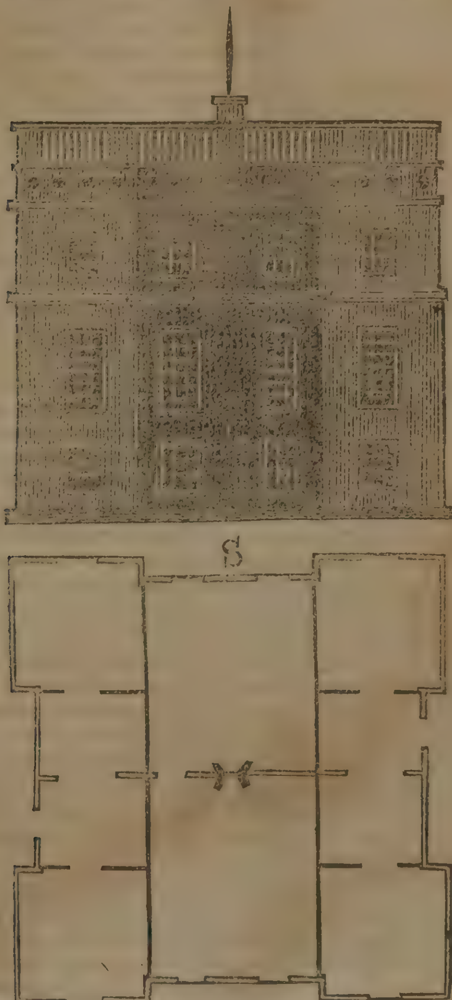
It generally happens that most of the houses burnt in country places, take fire in the roofs, while the family is from home, on a visit, or gone to church. On such occasions, children or servants begin to examine with lights the closets and lofts, which are usually filled with combustibles; or flakes of burning soot not unfrequently fall on the shingled roof. Country-houses are in most instances detached from the immediate assistance of neighbours; hence, in erecting them, security against fire is a point deserving particular attention. In order to promote this truly desirable object, we have annexed a cut of a country-house, founded upon certain principles, adopted by Mr. Bordley, of Philadelphia.

The floor of the basement story should be of brick, or flag-stone, raised about a foot above the surface of the ground, but by no means laid on joists over cellars; as these confine the damp air under them, render it pernicious, and there produce a mouldiness and smell, which are communicated to the air of the rooms above, so as to become perceptible. The floor of the second or best story, should be laid with rough strong boards, or planks, not more than three or four inches wide, nailed down across solid stiff joists, and covered with a thick bed of strong cement. The whole may be spread over with carpets, and the *wash-boards* and *surbase* be of cut stone, or marble. The floor of the 3d story ought to be laid with thick narrow boards and cement, and the wash-boards of cement rounded off. The cellars should be under a detached building, or under the stair-case of the principal house. It will also be necessary to strengthen the joists of the floors, by inserting pieces of plank between them, which will prevent their being shaken. The utmost care ought to be taken to avoid the use of wood as much as possible. For this purpose, the door and window-frames may be of stone or iron, and the doors faced or lined with the same. The joists and boards for the platform-roof and floors, and also for the stair-case, if the same be of wood, should be protected from the contact of fire by cements.

No outside cornice is requisite for a platform-roof, which may be constructed in the following manner: Joists, 12 or 13 inches deep at the big end, are to rest on the middle wall, and to be sloped thence 2-10ths of an inch per foot, to the smaller end on the exterior wall. These joists should likewise be from 2 to 3 inches thick, and from 12 to 14 distant from centre to centre; or they may be throughout of an equal depth, and sloping battens affixed to them, in order to give the platform-roof an oblique direction. At every 5 or 6 feet between the joists, pieces of plank nearly of the same depth with the latter, should be inserted at right angles, which will augment their strength. Stout, rough, narrow boards, 3 or 4 inches in breadth, and one inch thick, are next to be nailed down across the joists, with large rugged nails; which ought to be covered over with the following cement, 1 or 2 inches deep: Take one part of burnt, pulverized lime-stone, to which add two of clean sand and brick-dust; let the whole be well mixed together, and only such a quantity slaked, as can be worked up with the trowels, and laid on while it is hot. When the cement is dry, it should be coated with a mixture of three parts of *tar* and one of *fish-oil*, by means of a brush, on a hot sun-shine day. After this, a composition of tar and fish-oil, boiled down to a consistence between tar and pitch, should be laid on, and coarse sand, or small pebbles, sifted over the whole. Then another layer of tar only, of a similar consistence, should be applied, adding likewise small pebbles, but without any mixture of sand. By this process, the roof will acquire such a degree of hardness as to be impermeable to water.

In the annexed design, is a main partition wall across the place where the chimney is erected, and whence the joists extend 21 feet to the exterior wall. The stair-cases will be most conveniently placed in the

corner rooms, or passages. These principles, and the form of the house here represented, being adhered to, the size may be proportioned to the ability and intention of the proprietor.



In this design there are

			Feet.	Feet.
2 Passages, in the clear	21 by	$9\frac{5}{10}$ each	200, both	400
4 Rooms, the corners	12 by 12		144,	576
2 Ditto, ...	20 by 21		420,	840
			Whole area ...	1816

The cut consists of an elevation and plan, fronting the south. The entrance is either on the east or west sides, which require but little light. Between the ceiling of the uppermost story, and the platform roof, there should be a clear space 2 or 3 feet deep, with holes through the opposite walls. The hot air will thus be carried off, and a void space left for inspecting the state of the lower part of the platform. These air-holes may be 8 or 10 inches in diameter, with lattices of wire or twine, well soaked in the composition of tar and oil, in order to exclude birds; and, during the winter, they should have close shutters on the inside, to keep out the snow.

Dimensions of the Height.

Basement elevation of the walls	$9+1=10$ feet.
Second story	$12+1=13$
Third story	$9+1=10$
Vent space	$2+1=\ 3$
	36

The thickness and strength of the walls should be proportioned to their *height*. A *three-story* house would have a wall 36 feet above the ground; one of *two stories*, 26 feet; and that of *one story*, 15 feet: so that if one story require a wall one brick thick, two stories may have the basement one and a half, and three stories two bricks thick. The foundation-wall should be 3 feet deep in the ground, that it may acquire stability, and be out of the reach of severe frosts. For some families, it may be sufficient, and perhaps more convenient, to have only *one* or *two* stories of rooms. The lower the walls are, the greater will be their strength and durability. The *basement* and *second* stories may be divided according to the views of the builder, rather than the annexed plan. The *third* story, having the four square recesses at the corners of the design thrown into closets about 2 5-10th feet deep, will have an area, that may be divided into four roomy bed chambers. The middle wall, which crosses the passages, and divides the large rooms, will support the greatest part of the weight on the roof, and should, therefore, be particularly strong. The joists of the platform extend from this wall, in both directions, north and south, to the exterior walls. The recesses should be as shallow as possible; 1 and $\frac{5}{10}$ of a foot, if clear of wall, will be fully sufficient; for, if they be deeper, they will retain or concentrate heat, and harbour vermin.

The last, and most important point to be considered in the building of a house, is the structure of the chimnies; but as we have already discussed it, and pointed out the best and most improved mode of building them, we refer our readers to that article.

[For additional remarks on building houses, See article HOUSE.]

COW, in zoology, an animal too well known to require any description.

A perfect cow ought to have a broad forehead, black eyes, large clean horns, a long thin skin, a large deep belly; strong muscular

thighs, round legs, broad feet, short joints, and a white large udder with four teats. The use of this animal is equally important for the dairy, and the propagation of its species. For the former purpose, the Alderney breed of red cows is generally preferred, as they are supposed to yield the best milk; though the quantity they produce greatly depends upon the nature and quality of their food.

Grass growing spontaneously on good, sound, meadow land, is in general, deemed the most proper nutriment for those cows which are kept for the supply of the dairy. When, however, other green food cannot be procured, the tops and tenderest parts of furze may be chopped, bruised, and given to them. It is affirmed, that this vegetable is greatly superior to fodder; as it increases their milk, without imparting any unpleasant flavour. Carrots, oil-cake, cabbages, turnips, potatoes, and burnet, are excellent provision, and well calculated to afford beneficial winter-food for this useful animal.

The proper periods for milking cows, during the summer season, if they are well fed, are *three* every day, at the least, and at intervals as nearly equi-distant as possible, namely, in the morning, at noon, and in the evening, just before the approach of night. We are well aware that such practice is not generally followed in England, the cows being milked twice only in 24 hours: this method, however, is against all the rules of good economy; for experience has amply evinced, that if a cow be milked three times a day, she will yield a greater quantity, and as good, if not better milk, than by drawing her teats only twice, namely, in the morning and evening. We are, therefore, induced to recommend this circumstance to the attention of our agricultural readers; for, if by the bad milking of their cows, they lose only half a pint in quantity, they in fact are deprived of as much cream as six or eight pints would produce at the beginning of the operation, together with that part of the cream, which alone can impart a rich and agreeable flavour to butter.

Every precaution ought to be taken in the choice of milkers.... When this manual work is roughly performed, it becomes painful to the cow; but if a soft hand be gently applied, the animal seems rather to receive pleasure, and allows the milk to flow plentifully; as she possesses the singular faculty of retaining or parting with her milk. Indeed, instances have frequently occurred, in which one dairy-maid could not obtain a single drop, but another drew the milk in abundance, and without the least difficulty. For the same reason, when cows are *ticklish* (as farmers express it,) they should be treated with the most soothing gentleness, and never with harshness or severity. If the udder be hard and painful, it should be tenderly fomented with luke-warm water, and gently rubbed, in order to bring the creature into a good temper. Thus, she will suffer the milk to flow without restraint; whereas, if she retain, and not allow it to be drawn off freely, it will prevent her from yielding the accumulated quantity, and eventually dry up her udder. When a cow has been milked for a series of years, and begins to grow old, the most advantageous mode that can be adopted, will be that of *making her*

dry. To effect this purpose, a correspondent, in the 21st vol. of *Annals of Agriculture*, directs six ounces of white resin to be well pulverized, and dissolved in the evening in a quart of water; and at the same time to *house* the cow. ....On the following morning, she should be bled and milked, when the liquid is to be administered, and the animal turned out into the best grass. After these preparatory measures, she ought no longer to be milked, but may be fattened with any of the vegetables already pointed out, under the articles Black Cattle, Bullocks, and Cattle.

With regard to the cows intended for breeding, care should be taken to select those which give abundance of milk. For about three months previously to calving, if in the spring, they should be turned into sweet grass; or, if it happen in the winter, they ought to be well fed with the best hay. The day and night after they have calved, they should be kept in the house, and no cold, but luke-warm water allowed for their drink. On the next day, about noon, they may be turned out, yet regularly taken in, during the night, for three or four successive days; after which, they may be left to themselves. Every night, the cows thus housed should be kept till the morning cold is dissipated, and a draught of warm water given them previously to their going to the field. Without this precaution,they would be apt to *slip* their calves; an acciden twhich, independently of the loss it occasions, cannot fail to weaken them considerably. Where this is the case, and a cow begins to grow old, the most experienced farmers generally cause her to be *spayed*; and after keeping her two or three weeks from the cold, turn her into pasture. Such practice, if properly attended to, may be of considerable advantage, as the cows thus treated will thrive exceedingly, and soon be fit for sale.

Having already mentioned the advantages of *soiling* and *sweating* [cattle] (see page 36.) we shall only add here, that in the management of cows, a warm stable is highly necessary; and if they be curried in the same manner as horses, they not only receive pleasure, but will give their milk more freely. Farther, cows should always be kept clean, laid dry, and have plenty of good water to drink; in consequence of which, they will produce both more milk, and afford a quantity of rich dung, that will amply repay the trouble and attention bestowed upon them.

[In the management of milk-cows, it is essential that they be kept at all times in high health and good condition. If they are allowed to fall in flesh during winter, an abundant supply of milk need not be expected by bringing them into high condition in summer. So well convinced of this are the Germans, who attend Philadelphia market with milk, that they regularly feed their cows at midnight with short feed, during the winter. If cows are lean when calving, no management afterwards, will ever bring them to yield, for that season, any thing like the quantity of milk they would have furnished, had they been kept all winter in high condition. Cows ought to be kept to their fullest stretch of milk, from the time of their calving, till grass can be had in abundance. *Warm stables* are equally necessary. The

Germans in Lancaster county, find it economical to have warm stables, as beasts will not eat so much when kept warm, as when shivering with cold. Dr. ANDERSON speaks highly of the bruised twigs of the common furze, gorse, or whins, (*Ulex Europæus*) as winter food for cows.

The directions to curry and keep cows clean, given above, are of great importance. Baron D' ALTON, in a letter to the British Board of Agriculture, says, that in Hanover "it has been found, that currying cows *fed within doors*, and keeping them as cleanly as horses in a stable, are attended with the best consequences, both in regard to the milk they yield, and the rapid improvement of the cows themselves." Pure water is an essential article for cows. Dr. ANDERSON says, he knew a man who acquired great wealth by attending to things of this nature, and one of his principal discoveries was, the importance of having a continued supply of the purest water that could be obtained for his cows, and he would on no account permit a single animal to set a foot into it, nor allow it to be tainted, even by the breath of animals.

Cows in the United States are generally pastured: but the waste attending this practice has already been fully pointed out under the head CATTLE. It would be well to try whether cows might not be made to thrive as well by being kept continually in the stall, and at the same time, yield as much or more milk, as when permitted to feed at pleasure in a field. Baron D' ALTON says, they must be trained early to it, otherwise, they do not thrive; and yet a friend informs us, that during the time the British troops were in Philadelphia, he confined his cow upwards of a year to the stable, and by feeding her on good hay and occasional messes of short wet feed, with the usual attention to cleanliness, preserved her health, and obtained abundance of milk. It may happen, however, that all cows will not thrive equally well, if penned up; but the great advantages attending the practice of soiling and stall feeding, as respects the expenditure of the product of the ground, the making manure, and the preservation of the good condition of the land, are so incontestibly obvious, that the trial of the plan ought to be made by every one: where it is intended to keep calves of a particular breed, there can be no difficulty in the execution of it, for they may be easily reconciled to the confinement.

An acre of middling soil, should produce 20,000 lbs. weight of green clover, or 5,000 of dry clover. A large cow requires 110 lbs. of green, or 27 lbs. of dry clover per day; consequently, in 36 days, 40,150 lbs. or a trifle more than the produce of two acres. Whereas, the same cow, fed entirely out of doors, summer and winter, would require a pasture of four acres.

A writer, in the survey of the West Riding of Yorkshire, says, he kept thirteen cows one winter, on turnips, and oaten straw, without a mouthful of hay. They yielded thirty quarts of milk per day. To destroy the turnip taste in milk, See the article BUTTER.

The editor has heard, that in the neighbourhood of Bethlehem, in Pennsylvania, there is a breed of cows, remarkable for the great

abundance of milk they afford: and he has been assured, they yield from twenty to thirty quarts per day. But it ought to be remarked, that the owners are *noted for a regular system of full feeding, winter and summer.*

An observing English officer, Col. P. remarked, two years since, the breed of cows near Lancaster, which have "a fine small head, smooth and delicate hair, full eye, round rib, and straight back; and said, that the breed would be an acquisition to England, if introduced there."

It is said by the author of the *Agricultural Survey* of Middlesex, that an uncommon quantity of rich milk was yielded by the produce of a cross breed between an English cow and a buffalo obtained by the late JOHN HUNTER, of London, while the creature retained an uncommon propensity to fatten.

The peculiar anatomy of the cow, together with an account of the mode of relieving that useful animal in cases of difficult calving, by Dr. EBERHARD, was published in 1793, by the *Agricultural Society* of Amsterdam, and is well worthy of an English dress.]

Cows are liable, in common with other cattle, to the DISTEMPER, (which see) and various other diseases (see CATTLE) but more particularly to a stoppage, that occasions the feces to dry up in the intestine, vulgarly called *farthing-bound*; or, perhaps, with more propriety, *knit*; for, by the motion of the intestines, one of them, or part of it, is surrounded with a strong ligament, which totally impedes the passage, and adheres to the inside of the loin. Animals affected with this malady, loath their food, and frequently move their hind-legs inwardly, and up towards their bellies. The only remedy at present known is, to throw them on the ground, and make an incision in the flank, wide enough to admit the hand: thus the operator will immediately find the ligament, which must be separated with the thumb-nail; when the intestine will be released, and return to its proper position. The incision may then be sewn up; and the animal will in a short time completely recover. Although the disorder here described, is at present chiefly prevalent in the weald of Kent, and in the adjacent parts of Sussex; yet we apprehend it is not confined solely to those places, and have therefore discussed it with some attention; which may, perhaps, tend to restore to health many useful animals.

External injuries done to the udder of a cow, by blows, falls, friction, wounds inflicted with sharp or pointed instruments, by the violent sucking of calves, or the rough treatment of milkers, are frequently of serious consequence, and occasion the milk to be tainted with blood. While the inflammation continues in an indolent state, the parts affected should be anointed several times a day with fresh butter, or a salve prepared of one oz. of Castile soap dissolved in a pint and a half of fresh cow's-milk over a moderate fire, stirring it constantly, to form a complete mixture. But, if the udder and teats be considerably inflamed, it will be necessary to make use of internal remedies. For this purpose, take one pound of common salt, and four ounces of salt-petre, mix them carefully, and give 2 table-spoonfuls of the pow-

der, every three hours, in a gallon of water mixed up with a little oatmeal.

[An ointment made of the juice of the leaves of the *Datura Stramonium*, (Jimson weed), and hog's-lard, is an excellent application for a swelled udder.]

Should, however, from neglect, the disorder have made such progress as to exhibit hard tumours, in this case fomentations, made of the following herbs, ought to be used: Take of common hemlock, or *conium maculatum*; dwarf, or small-flowered mallow, or *malva rotundifolia*; common melilot, or *trifolium melilot offic.*; of each one handful; boil them in a sufficient quantity of water; apply them diligently, not warmer than the animal can bear it; and, as soon as a tumour opens, the sore should be properly cleansed, and then covered with a plaster of basilicon ointment, or Turner's cerate.

To promote the cure of such ulcerated parts, especially in very obstinate cases, we recommend another remedy, which has often been attended with success. Take Castile soap, gum ammoniac, gum galbanum, and extract of hemlock, one ounce of each; form them into eight bolusses, and administer one of them every morning and evening.

Lastly, to prevent cows from sucking their own milk, we are informed, that rubbing the teats frequently with the most fetid cheese that can be procured, has proved an effectual remedy.

COW-PARSNIP, or Hog-weed, the *Heracleum*, L. a native genus of plants, producing two species.

1. The *Sphondylium*, or Common Cow-parsnip, which is found in hedges, meadows and pastures. It is biennial, and bears whitish flowers, which blow in the month of July: its stalks grow from three to four feet high. In Poland and Lithuania, the peasants prepare a liquor from the leaves of this plant, which, after undergoing fermentation, is brewed, and drank instead of beer. As this beverage is perfectly harmless, it might with advantage be substituted for some kinds of ale, in which the most pernicious substances are infused, with a view to *give it a head*..... The inhabitants of Kamtschatka peel the roots, which afford a nutritious and wholesome food. An ardent spirit is also distilled by the Russians and Poles from the medullary substance of the stalks, and sometimes from the whole branches, which are first fermented in water with the great bilberries (see vol. i. p. 255), from which they obtain a liquor of considerable strength. It is more agreeable to the palate than the ardent spirits distilled from corn; though we must observe, on the authority of Dr. Bohmer, that it is a still more intoxicating and pernicious liquor than *whiskey*. Hogs, rabbits, and asses, are extremely fond of the leaves, which are also eaten by cows, goats, and sheep, but not relished by horses.

2. The *Angustifolium*, or Narrow-leaved Cow-parsnip, which is found in woods, and flowers in July. It has no peculiar properties.

Cow-Parsley, or Cow-weed. See Chervil.

[COW-POCK, *Vaccine*, an eruptive disease, which attacks the udders of cows, and which, when transferred to the human system, effectually secures it from the small-pox.

This disease, which may be just-

ly considered as one of the greatest temporal blessings conferred by Providence upon mankind, was known forty years ago in Germany, and also the fact of its being a preventive of the small-pox. The same fact was likewise known in the dairy counties of England for nearly the same period, but in both countries the evident application of the important principle connected with it, was unattended to, until Dr. EDWARD JENNER brought it fairly before the public a few years since in England. The disease is now found in New-England, among cows. The power of the disease to prevent the small-pox, is at length proved beyond all doubt by *many thousand experiments* in Europe and the United States.

The distance, as communicated by inoculation, in its commencement much resembles the small-pox. Towards the close of the second day, when the operation takes effect, (that is 36 to 48 hours, from the period of inserting the virus) a light speck of inflammation is perceived. On the fourth day a minute pimple may be felt rising above the skin, surrounded by a circular imflammation at its base. It now gradually increases in size, and by the close of the fifth day, begins to assume (especially if viewed with a magnifying glass), that appearance which so much distinguishes it from the small-pox. This consists in the perfect regularity, and beautifully circumscribed form of the pock, which has a surface flattened, with a depressed centre, of a darker colour, so as to give an appearance of elevated edges. In the small-pox, on the contrary, by the sixth day, the inoculated part begins to assume an irregular, or angulated appearance, and its surface is not so flattened in proportion to its diameter. This circumscribed appearance is retained by the cow-pock (vaccine) during its whole progress, even during the process of its scabbing, while the small-pox becomes daily more irregular, in consequence of the confluence of the adjoining pustules. About the fifth day, the pock begins to change from the red pimple to a vesicle containing a fluid, which through the cuticle much resembles the colour of whey. This fluid is at its first formation, in its most active state, and probably will be less liable to fail, if taken at this early period, than if delayed to a later day...... From the *sixth* to the *tenth* is mentioned as the proper period for collecting it. About the eighth or ninth day, the pock having arrived to maturity, the constitutional symptoms begin to shew themselves: the general indisposition being preceded by swelling and pain of the pustule shooting up towards the socket of the arm.... Languor, drowsiness, paleness, chilliness, and flushes of heat, headach, pain and fulness of the eyes, loss of appetite, and frequency of pulse follow. The marginal inflammation continues to extend one or two inches in diameter, forming a beautiful efflorescence, or areola, which has been regarded as a proof that the general affection of the system had taken place. This areola, however, does not always exist, and yet the preventive property of the disease is perfect.

The febrile symptoms vary considerably: and sometimes ugly sores are induced by rubbing off the scab in its forming state, or by the friction of clothes. Care must therefore be taken to avoid these causes. For the above observations,

we are chiefly indebted to the late excellent publication on the vaccine disease by Dr. COXE, which should be in the hands of every practitioner, and master of a family remote from medical aid.

The following concise directions for vaccinating may be found useful.

1. The vaccine pock matter being generally, when first taken from the vesicle, a thin limpid fluid, it becomes, when dried, scarcely visible, either on *glass*, or on the end of a *lancet*, even on a quite new one. If the matter be taken on thread, it will be perceived by the stiffness of it when dried.

2. If the matter is not used immediately on its being taken from the vaccine pock, it will of course be dry; and when employed, it should be softened by the smallest particle of hot water; and, to avoid too great dilution, it should be done by a particle of hot water, hanging on the extremity of a needle.

3. The inoculation must be performed in the same manner as for the small-pox; but it may be useful to recommend, that,

4. Matter be inserted in one place only in each arm, by a very small scratch or puncture of the skin.

5. One armed lancet should be used for only one, or at most two punctures.

6. If the infection take, there will be seen in the inoculated part, in four days, or less, a red spot, like a small gnat bite. In six days, there will be generally a very small vesicle. In nine days, a circular vesicle appears, as large as a pea, often surrounded by a red areola. In twelve days, the red areola will generally surround the vesicle, which then begins to dry, and turn black in the middle.

Between the eighth and eleventh day, a slight fever often takes place.

By the fourteenth day, the vesicle usually changed into a circular dark brown scab, which should by no means be removed, but left to fall off, which it will do in two or three weeks, leaving a pit.

If in four days the gnat-bite appearance be not manifest, the inoculation should be repeated.

7. For inoculation, matter may be taken between the sixth and tenth days, generally.

8. A considerable redness, like Erysipelas, sometimes comes on, and spreads over the arm, about the eleventh or twelfth day, which goes off of itself commonly in a day or two; but cooling applications will often be of service, and never do harm. An emollient poultice should not be applied, except in particular cases of phlegmonous inflammation.

9. The medical treatment is the same as that of the inoculated small-pox.

10. As the vaccine inoculation, as well as the small-pox inoculation, produces sometimes a local affection only, without any perceivable disorder of the constitution, it will be safest, in doubtful cases, to re-inoculate the subject; and if no local disease be produced, or only an imperfect vesicle of a few day's duration, sufficient security will have been obtained by the first inoculation.

How to vaccinate several hundred persons with the matter of a single ordinary vaccine pock......From Tilloch's Phil. Mag. vol. 13.

A member of the Vaccine Institution mixed the fluid of a single

cow-pock with a dram measure of water of about the temperature of 70 deg. of Fahrenheit. Of *three* subjects inoculated with this diluted matter, two took the disease in the usual way. The remaining third was inoculated in each arm with one puncture with this diluted matter, and also in each arm, in like manner, with undiluted cow-pock matter; but all these four punctures failed to produce the vaccine disease, the subject being an adult, and probably had had the small-pox.

Though in the above directions the treatment is said to be the same as for the small-pox, yet in many cases, not a particle of medicine has been given, nor has the patient lost an hour. *It cannot be communicated by a near approach to a vaccinated subject, neither has death occurred from it in a single instance.* A gentle dose of medicine, together with abstinence from animal food are nevertheless proper.

Great care ought to be taken to distinguish between a true and spurious cow-pock. The difference between them, may be easily ascertained by any one who has seen the regular progress of the true pustule. To those who have not seen it, the description above given of it will be sufficient. But if any anxiety remain as to the certainty of having passed through the true disease, Mr. BRYCE of Edinburgh, has assured us that all doubts may be dispelled by the following experiment. On the sixth day after vaccination, let the patient be vaccinated again. If the first pock has succeeded, the second pustule will run its course so rapidly as to have its areola, and to terminate about the same period as the first. In a mere local affection, this is not the case. The editor can confirm the truth of this test. It must be remarked, that in order to derive security from the small-pox by vaccination, the system must have suffered the latter disease, or at least have experienced the constitutional symptoms, which probably cannot be the case before the tenth day after vaccination.

The small-pox and vaccine will *sometimes* go through their regular courses at the same time.

Mr. BRYCE, surgeon of the Vaccine Institution in Edinburgh, lately announced to the world, that the *scab*, or crusts formed upon the vaccinated part, if partly dissolved in water, will produce the affection with as great certainty, and regularity as with virus newly taken and used in the common way..... The editor has lately tried the experiment in four cases with success, and Drs. Coxe and De Wees of Philadelphia, have also repeatedly succeeded in communicating the disease with the crust.

It may be proper to observe that Mr. B. considers the crust of the vaccine pock, "as the real extractive matter, if it may be so called, of the most pure and active virus secreted in the cells of the vesicle." This important discovery will enable us to preserve the infection of the cow-pock more easily, than by the limpid fluid on glass; great attention should therefore be paid to the preservation of the crust...... Should any new and important facts be made known on this disease, in the course of the present year, they will be given under the article VACCINE.]

COW-QUAKES. See QUAKING-GRASS.

COWSLIP, the Common, or Paigle, or Cowslip-primrose, *Pri-*

mula veris, L. a native perennial plant, growing in meadows and pastures, on a loamy or clayey soil. It produces sweet-scented yellow-flowers, which appear in April, and are used for making cowslip-wine, or balsamic tea. Its roots have a fine odour, similar to that of anise; and give additional strength to ale or beer, when immersed in the cask. The leaves and flowers of this plant are excellent food for silk-worms, which are extremely fond of them; they are also eaten as a pot-herb, and in salads. Cattle eagerly feed on the leaves.

COW-WHEAT, or *Melampyrum*, S. a genus of native, annual plants, comprising four species, of which the following are the principal:

1. The *arvense*, or Purple Cow-wheat, which grows in corn-fields, and is chiefly found in the county of Norfolk. It bears flowers of a yellow dusky-purple, which blow in the month of July, and are succeeded by yellowish seeds. These, when ground with corn, impart a dusky, greyish cast, and a bitter flavour to the bread; but do not render it unwholesome. A decoction of the flower-spikes produces a tolerably durable blue colour, and, with the addition of the fixed vegetable alkali, a purplish red. CRONSTEDT, the Swedish mineralogist, obtained a fine blueish colour, from the stalks alone; but none from the leaves and flowers. The plant is eaten by cows and goats, but refused by sheep.

2. The *pratense*, or Common yellow Cow-wheat, which grows in woods and thickets, especially on clayey soils. Its blossoms are of a deep yellow colour, with white tubes, and appear in July or August. Hogs eagerly eat the seeds, but reject the plant, which is also refused by horses. It is, however, eaten by sheep and goats, and particularly by cows, which are extremely fond of it. Where this plant abounds, the butter is yellow, and uncommonly good.

3. The *Sylvaticum*, or Wood Cow-wheat, which is very rare, being found only in some woody, shady places, in the hilly parts of Scotland. Its blossoms are entirely yellow, and flourish from June to August; but have not the white tube of the preceding species, with which it is frequently confounded. It is eaten by cows, sheep, and goats: if it be given them in abundance, they will thrive remarkably, and soon grow fat.

COX-COMB: See YELLOW RATTLE.

CRAB, in fruit-trees, a disease which attacks the bark, especially after transplanting them from the nursery: it destroys particularly the inner bark, by reducing it to a blackish powder, not unlike the smut in wheat.

Various conjectures have been formed, as to the origin of this formidable disorder, which is often very destructive, especially to apple and pear-trees; but none appears to us satisfactory. It is, however very probable, that it arises from the inattention of gardeners, when transplanting young trees, so as to change their situation to a different point of the compass; for instance, by placing the northern side of the trunk towards the south; where the powerful rays of the sun parch and in a manner burn, the tender bark. This supposition is confirmed by the circumstance, that the disease generally makes its first appearance on the south

sides of the bark; though, we believe, it also frequently originates from external injuries done to the tree, such as blows, scratches, &c.

The most expeditious method of relieving a tree thus affected, is that of immediately cutting out the *whole* diseased part, with a very sharp gardener's knife, and not to leave the smallest trace of its discoloration on the trunk; for an imperfect excision is attended with inevitable ruin to the tree. As soon as the operation is performed, the wounded places must be carefully covered with a plaster, made of equal parts of fresh clay, garden-mould, and cow-dung; or with the medication mentioned in our first volume, under the article CANKER.

CRAB-FISH, the Common, or *Cancer-major*, L. is a species of shell-fish, that inhabits our shores, and lurks or burrows under the sand: it is sold almost exclusively to the poorer class of people. As crabs, however, generally are in a state nearly approaching to putrifaction, before they arrive at the markets of inland towns, the eating of them is attended with considerable danger.

The *claws* of crabs form an article of the apothecaries' shop. The tips or ends of them only are used; after being broken down and well washed in boiling water, they are levigated, and yield a whitish powder, which is employed as an absorbent, especially where acidity abounds in the stomach and bowels. Formerly, this preparation was much employed in diarrhœas, and especially in the HEART-BURN, to which we refer.

CRAB-TREE, or *Pyrus malus*, L. is an indigenous plant, growing in woods and hedges; it flourishes better on declivities and in shady places, than in open, exposed situations, or on boggy soils. Its blossoms are white, and appear in the month of May.

This is the parent-stock, from which the numerous varieties of the apple are obtained, and on which the better sorts of them are grafted; because its roots are neither killed by frost, nor eaten by field-mice. Grass, and even corn, will grow beneath it. The wood of the crab-tree is tolerably hard, turns clean on the lathe; and, when made into cogs for wheels, acquires a polish, which renders it very durable. The acid juice of the fruit is commonly termed *verjuice*, and is much employed in recent sprains, and in other cases, as an astringent or repellent. This fruit is eaten by horses, cows, sheep, goats, and particularly by hogs, which are extremely fond of it.

Crab-trees abound especially in our forests, and their fruit furnishes abundance of food for deer, in the latter part of autumn, when grass begins to fail; and in winter they brouze on its branches, which are cut down for that purpose. As this species quickly attains its growth, it deserves to form a part of every plantation; and we have only to regret, that it is not more generally cultivated, as it will in a short time amply compensate the trouble and expence bestowed on setting it.

In dyeing, the bark of the crab-tree has been employed for extracting a yellow, and especially a citron colour: DAMBOURNEY relates, that the dry shavings of this wood imparted a fine chesnut-brown to wool prepared by a solution of bismuth. See Article FRUIT.

[CRADLE, a frame joined to a scythe, useful in harvesting, by the

help of which, three times the quantity of grain may be cut down in a given time that can be with a sickle, and laid tolerably even for binding in bundles. This machine shall be particularly described and represented under the Article SCYTHE.]

CRAG, a species of manure, consisting of the fragments of various marine shells, which abound on the greatest part of the cliffs, contiguous to the British coast. They are often found 40 or 50 feet higher than the level of the sea, and sometimes at a considerable distance from the shore.

This kind of manure has but lately been introduced into rural economy, and is not yet sufficiently known. The husbandman, indeed, who is so fortunate as to discover it near his farm, finds a treasure of which he cannot avail himself too soon; as it will not only warm and meliorate a cold, wet, clayey soil, but also restore exhausted land, and render it equal to any, in richness and fertility.....See MANURE.

CRAKE-BERRY: See Black-berried HEATH.

CRAKE-NEEDLE: See Common Shepherd's NEEDLE.

CRANBERRY: See BILBERRY.

CRAMP, a kind of numbness, or involuntary contraction of the muscles, attended with a convulsive effort of the neck, arms, legs, &c. as likewise with a violent but transitory pain. Aged, sedentary, and infirm persons, are peculiarly liable to this complaint, for which a variety of remedies has been tried, with occasional success. Sometimes a garter applied tightly round the limb affected, will speedily remove the complaint. When it is more obstinate, a brick should be heated, wrapped in a flannel bag, and placed at the foot of the bed, against which the person troubled with the cramp may place his feet. The brick will remain warm the whole night, and thus prevent any return. No remedy, however, is equal to that of diligent and long continued friction, which will restore the free circulation of the blood in the contracted part, while it is more simple, expeditious, and more safe in its effects.

If the cramp attack the interior organs, such as the stomach and bowels, it is always attended with danger; as frequent returns of it may terminate in death. Medicines may *relieve*, but *cannot cure*, organic affections of this nature; hence we seriously advise such patients to adopt, *betimes*, a more temperate and regular mode of life; to abstain from spirituous mixtures and *all* fermented liquors; to abandon the practice of inundating their stomach two or three times a-day with *hot* tea; to shun smoked, salted, and pickled provision of every kind, as well as fat, rancid, flatulent, and such dishes as require a vigorous digestion; in short, to avoid both the *predisposing* and *exciting* causes; the latter of which will be generally found in their own irritable temper, by indulging in fits of anger; or other depressing passion: thus, the animal fibre becomes suddenly relaxed, and again contracted, so that a paroxysm of the cramp is the inevitable consequence. On such distressing occasions, if they value a precarious life, we conjure them never to fly to the brandy-bottle, nor to take any stimulant medicines, such as laudanum, vitriolic æther, &c. which only prepare the stomach for sustaining a new attack, and accelerate the destruc-

of the patient. On the contrary, the mildest emollient drink, for instance, gruel, barley-water, chamomile tea, ought to be instantly procured, and small draughts of half a tea-cupful at a time be given, *luke-warm*, with 10 or 15 drops of deliquated salt of tartar in each, to be repeated every half hour, or oftener, as may be found necessary.......See CONVULSIONS and SPASMS.

CRANE, a machine used for raising large stones and other ponderous bodies. From the numerous accidents which attend the common cranes, several skilful machinists have attempted to contrive such as would be more safe, and at the same time more easy in their operations.

The *first*, in point of time, is that invented by the late ingenious Mr. JAMES FERGUSON; which has three trundles, with different numbers of staves, that may be applied to the cogs of a horizontal wheel with an upright axle; round which is coiled the rope that draws up the weight. This wheel has 96 cogs, the largest trundle 24 staves; the next 12, and the smallest 6; so that the largest revolves 4 times for one revolution of the wheel; the next 8; and the smallest 16. A winch is occasionally fixed on the axis of either of these trundles, for turning it, in proportion to the weight intended to be drawn up. While this is raising, the ratch-teeth of a wheel slip round below a catch, that falls into them, prevents the crane from turning backwards, and detains the weight in any part of its ascent, if the man who works at the winch, should accidentally quit his hold, or wish to rest himself, before the weight is completely raised.

The *second*, is that invented by Mr. ABRAHAM ANDREWS, of Higham Ferrers, Northamptonshire. This machine weighs the body suspended, while it is raising; an improvement for which the *Society for the Encouragement of Arts*, &c. in 1791, granted him a premium of 15 guineas.

The proportion of the beam in the annexed plate (Fig. 1.) is as 1 to 20, the large weight being five pounds, and the smaller $\frac{1}{4}$ of a pound. The latter, when fixed on the beam-end, will equi-poise the former, if hung on the pulley at the end of the gib-beam, which should be placed in a right line with the crane, at the time the weight is adjusted; otherwise it will occasion a friction that may prevent the moveable beam from playing freely.

Description of Mr. A. Andrews's Crane in the annexed Engraving.
Fig. 1.

The gib of the crane stands on a horizontal beam, moveable on a centre, at *A*; and the distance of the centre, *A*, from the bearing of the upright, being to the distance *B*, in the proportion of 1 to 20, the weight placed at *B*, determines that of the body suspended in the same proportion. *C* is a stub, or piece of wood, which projects from the weight hanging at the end of the gib, and serves to prevent the beam from rising to too great a height.

One of the latest improvements in this useful machine, is that proposed by the Rev. E. C. in the 2d. vol. of the *Repertory of Arts and Manufactures*. It consists simply in introducing the action of a worm that communicates the first motion to the crane, upon the axis of

the wheel in which the man walks. The axis of this wheel, and that of the worm, are proposed to be in separate parts, and occasionally united by a coupling-box. When goods are to be raised, the two axes should be connected; when lowered, they may be disunited, and the worm turned by a winch. Thus, the ascent, or descent, of the weight may be accelerated, or stopped, at pleasure, by the person walking on the axis of the wheel, or turning the winch; without the remotest possibility of being overpowered by the descending weight.

Explanation of the annexed Engraving, Fig. 2.

A, The wheel in which the man walks.

B, The coupling-box.

C, The worm.

D, The wheel in which it works,

E, A wheel upon the same axis, giving motion to *F*.

F, A wheel upon the axis of the windlass.

G, The winch.

This machinery (the ingenious projector adds) may be applied to a crane already erected upon the common principle. He proposes to put a wheel on any convenient axis in the machine, in its present state; and, on this, a worm that may be thrown in or out of *gear*, at pleasure; and to let the lever, by which it is effected, lie within the reach of the man's hand in the wheel. The goods being fastened to the crane, and raised from the floor of the warehouse, in order to be let down, the man puts the worm into gear, leaves the wheel, and causes them to descend by the winch.

These contrivances are alike eminent for their ingenuity; and though we do not venture to prefer either, yet we seriously recommend the adoption of some one of these improvements, as we are fully persuaded, that many fatal accidents may thus be easily avoided.

CRANES-BILL, or *Geranium*, L. a genus of plants comprising 145 species; of which Dr. SMITH states only 13, but Dr. WITHERING 17, to be indigenous. None of these, however, are cultivated.

The only species reared in this country, are those brought from Africa, and other southern parts of the globe, which, from their extreme tenderness, can only be raised in green-houses. These may be propagated by the roots, but more abundantly by seed, which should be sown towards the end of March, in beds of light earth, being carefully shaded from the sun, and frequently, though gently, watered, till they are well rooted. It is, however, necessary to cover them with mats, which should be removed in mild showers, and also during the hot summer nights, that the plants may have the benefit of the dew. In the course of two months, they should be carefully transplanted into pots, about seven inches wide, and filled with light earth. They are then to be kept in a shady place, being frequently watered, till they have again taken proper roots, when it will be necessary to expose them more to the air, till the month of October, in order that they may become vigorous and hardy. As soon as the cold frosty mornings approach, they should be removed into the green-house, and placed near the window, which may be open till

the cold become intense. During the winter, also, they should be occasionally watered, and their decayed leaves carefully separated. They must not, however, stand under the shade of any other plants, as their vegetation would thus be obstructed; nor will they require any artificial heat.

Cranes-bill is recommended as one of the greatest vulneraries and abstergents of the vegetable creation; and is highly extolled for its styptic power, in hemorrhages of every description. These properties have been sufficiently ascertained by experience; and it is therefore to be wished, that this plant were brought into more general esteem in the shops, where, at present, it is totally disregarded. [See GERANIUM.]

CRAPE, a light, transparent stuff, somewhat similar to gauze: it is made of raw silk, gummed, twisted on the mill, and woven without crossing. It is mostly used for mourning.

Crape is either *crisped* or *smooth*: the former is double, and expresses a deeper mourning; the latter single, and is worn in ordinary cases, or for more distant relations. The silk destined for the first, is more closely twisted than that for the second; as the greater or less degree of twisting, especially of the warp, produces the crisping given it, when taken out of the loom, immersed in clear water, and rubbed with a piece of wax.

Crapes are either black or white: the latter are used chiefly in the dress of young persons, or such as are devoted to celibacy. The former sort is always dyed in a raw state, that it may more deeply imbibe the colour.

CREAM, the most oily part of milk: it is specifically lighter than the other constituents, collects and floats on the surface, whence it is generally skimmed, in order to separate effectually the caseous and serous parts employed for the making of BUTTER and CHEESE, to which we refer.

Cream is an agreeable and very nourishing article of food, when fresh; but too fat and difficult to be digested by persons of a sedentary life, or possessed of a weak stomach. It is nevertheless of considerable service in medicine, as a lenient (though palliative) application to tetters and erysipelas, which are attended with pain, and proceed from acrid humours.

A method of preserving cream: Take 12 ounces of white sugar, and dissolve them in the smallest possible quantity of water, over a moderate fire. After the solution has taken place, the sugar ought to be boiled for about two minutes in an earthen vessel; when 12 ounces of new cream should be immediately added, and the whole uniformly mixed, while hot. Let it then gradually cool, and pour it into a bottle, which must be carefully corked. If kept in a cool place, and not exposed to the air, it may be preserved in a sweet state for several weeks, and even months.

CORSTERPHIN CREAM, is a peculiar form of curd, much esteemed in the vicinity of Edinburgh, where it is prepared in the following manner: A vessel, the bottom of which must be perforated and stopped with a peg, is filled with skimmed milk, and placed within a tub or pail nearly full of boiling water: here it is suffered to remain for 24

or 48 hours, till the milk coagulates, and the watery part has subsided. The latter is then allowed to drain, by withdrawing the peg; when the hole is again closed for 24 hours; at the end of which, an additional quantity of water is drawn off, and the curd generally acquires a due consistence: it is then briskly agitated with a wooden stick, and thus becomes fit for use.

In the summer season, this preparation affords an agreeably acid and cooling repast, which is in a certain degree nutritive; though it should not be eaten by those whose digestion is weak or impaired. See DAIRY.

CREAM of TARTAR. See TARTAR.

CREDIT, in commerce, a mutual trust, or loan of merchandize, or money, on the reputation of the property or solvency of a dealer.

Credit is either public or private. Every trader ought to possess some estate, stock, or portion of his own property, sufficient to carry on the traffic in which he is engaged: his dealings should also never exceed his capital, so that no disappointment in his returns may incapacitate him from supporting his credit. Yet traders of worth and judgment, may sometimes be obliged to borrow money, in order to carry on their business to the best advantage. We cannot, however, avoid observing, that the almost unlimited credit given to wholesale, as well as retail traders, is by no means a prudential, or even justifiable practice; for it not only tends to encourage the most shameful monopoly carried on, at present, with many articles, both of subsistence and convenience (for instance, those of *bread-corn* and *paper*;) but here also we may discover the prolific source of those bankruptcies which swell every Tuesday's and Saturday's Gazette.

The *public* national credit is said to *run high*, when the commodities of that nation are readily sold at a good price, and when dealers may be safely entrusted with them: also, when houses and lands meet with ready purchasers; money is borrowed at a low interest; and, lastly, when notes, mortgages, &c. will pass as currently as money.

Private credit has no accurate scale, and depends entirely on the mutual confidence of the parties. When it is extended beyond a certain length, without proper controul (as is too frequently the case with families of a certain *rank* or *fashion*,) we may safely predict, that the following generally are its concomitant effects, viz. inferior goods, higher charges, inaccurate calculations, and law-suits, which dissolve all future connection.

CRESS, or Cresses, *Sisymbrium*, L. a genus of plants, consisting of forty-one species, eight of which are natives: the principal of these are:

1. The *Nasturtium*, or common water cress, which is found in springs, brooks, and rivulets. It is perennial, and produces white flowers that are in bloom in June or July. The leaves have a moderately pungent taste, and penetrating smell, somewhat similar to, though much weaker than that of mustard-seed. Water-cresses are universally used and eaten as an early and wholesome spring salad. Being an excellent antiscorbutic and stomachic, they are nearly allied to scurvy-grass, but do not possess so great a degree of acri-

mony. They are also supposed to p rify he blood and humours, and to open visceral obstructions.

2. The *amphibium*, or Radish-Water-cress, growing in watery places, and on the banks of rivers. It is perennial, and produces yellow flowers, which blow from June to August. Its roots may be used as a substitute for common radishes. Sheep and goats do not relish this plant, and it is never touched by cows.

3. The *Sophia*, or Flax-weed Water-cress, which is found on old walls, and among rubbish. It is annual, and bears yellow flowers, in July, which are succeeded by long, stiff, crooked pods, containing yellow seeds: these remain in their capsules the whole winter, and not only support the small birds during that inclement season, but have occasionally been employ-with success, as a vermifuge. The plant is eaten by cows and sheep; but is not relished either by horses, goats, or hogs.

CRICKET, an exercise or game, performed with bats and a ball.... This sport was formerly confined solely to the labouring class of people, but is now becoming daily more fashionable among those, whose rank and fortune entitle their countrymen to expect a very different conduct.

Although we have, on all occasions, enjoined *proper* muscular exercise, yet we strongly reprobate that of cricket, which is in all respects too violent, and, from the positions into which players must necessarily throw themselves, cannot fail to be productive of frequent injury to the body. Indeed, we have witnessed several melancholy accidents which lately happened in our neighbourhood; and dislocations of the hip-joint, in particular, are by no means uncommon, from the aukward posture occasioned by employing *both* arms, at the same time, in striking a distant object. We trust the time is not very remote, when this game, like that of *pugilism*, will be utterly exploded by all who possess a correct taste, and have any regard for their constitution, as well as their respective situations in life.

CRICKET, the COMMON, or Hearth-cricket, *Gryllus domesticus*, L. an insect which delights in new-built houses, where the moisture and softness of the mortar enable it to penetrate between the joints of the bricks or stones, and thus to open communications to different rooms.

Crickets have a great partiality for kitchens and baker's ovens, on account of the continual warmth to be found in those places. They are known by their lively, chirping notes, performed by a sudden friction of their wings, or by striking them against their hind-legs: this noise, however, is peculiar to the males, and increases towards night, when they leave their secret haunts. The female deposits her yellowish eggs in the earth, or rubbish, whence the insects emerge in 12 days, and attain their full growth in six or eight weeks, after having four times changed their coats. Towards the latter end of the summer, they are observed to fly; a circumstance which accounts for their suddenly retreating from one place, and appearing at another.

An easy method of destroying this insect, is to place phials, half full of beer, or any other liquid, near their holes, whence they will

crawl into them, and cannot escape. Cats are very fond of crickets; but the vast quantities they consume, often occasion their death. Hence it is more advisable to destroy these insects, either by pouring hot-water into the holes through which they retreat, or exposing boiled peas, or carrots, mashed up with quicksilver, in places which they frequent. Another mode of exterminating them, consists in placing pea-straw near their habitations, and then immersing them into water, together with this straw, to which they are peculiarly attached.

CRIME. See PUNISHMENT.

Crocus. See SAFFRON.

CROP, usually signifies the corn gathered off a field, in harvest.

Till the middle of last century, the best common courses of farming in Britain, consisted of a *fallow*, which, by several ploughings, broke up and cleaned the ground, but left the soil exposed to the scorching rays of the sun, during the hottest season, without any shading crop; and on this the farmer sowed *wheat*, which was succeeded by *peas* or *beans*; then followed *barley*, or *oats* (or both) on one part of the farm, for the space of ten or twenty years: the other moiety, during that time, being laid out in common pasture grasses. When any change was to be made, the part in grass was ploughed and prepared, and then thrown into the same course or rotation of crops as above: that which had been in crops, was sown with mixed grass-seeds, (but not clover), to lie for ten or twenty years, as before.... The whole arable part of the farm thus parcelled, included neither the homestead nor the standing meadow; so that an arable farm of 300 acres admitted of 150 being in grass lay, or old field, and 150 in crops. The fields which bore crops, were seldom equal in quantity, but in the following plan we have ventured to consider them so, for the better comparing of the *old* and *new* systems:

No. I.

Acres.		Bushels.
$37\frac{1}{2}$	fallow, naked, yields nothing.	
$37\frac{1}{2}$	wheat, ...	555
$37\frac{1}{2}$	peas, or beans, ...	555
$37\frac{1}{2}$	barley, ...	740
150	in crops, 4 fields, . . .	1850
150	in grass, or lay.	
300	acres.	

The fallow, wheat, and barley crops, are *exhausting*, that is, they deprive the land by exhalation of part of the vegetable nutriment deposited in it; the peas, or beans, which operate as a manure, ameliorate; but the rays of the sun on the naked soil, in the hot season, cause a considerable portion of the essence of the manure, and also of the ground, gradually to exhale.

The new system of rotation or courses of crops, was introduced about the middle of the 18th century, and is founded on the following principles, namely; 1. To *fallow*, and at the same time, to have a *shading* and ameliorating mild crop growing on the fallow, while it is under the plough or hoe; 2. Never to sow any species of corn in succession; 3. To sow *clover*, or an equivalent on every field of small grain; and lastly, by means of a course of well selected crops, to prevent the soil from *resting*, *hardening*, and running into weeds.

By this method, entire farms are continued in a constant rotation under 4, 6, or 8 divisions, or fields, in such a manner as to improve the soil, and consequently, to produce a larger income.

No. II.

Acres.		Bushels.
60	barley, ...	1200
60	clover, ...	
60	wheat, ...	900
60	clover, ...	
60	peas, or beans, ...	900
		3000

300 acres, in 5 fields.

According to this new course, the wheat and barley exhaust the soil, while the clover and peas, or beans, ameliorate and improve it.

When we compare these two systems of rotations of crops, the latter is evidently the most profitable, as the 120 acres in clover are far superior to the 150 acres of common grasses on the *hide-bound* soil of the lay, or old field; and the grain and straw are more advantageous in the proportion of 300 to 185. Clover, peas, and beans, (if sown in drills, and kept clean from weeds by hoeing), are inoffensive, and even ameliorating.... They all *shade* the ground during the hottest season of the year. Every kind of corn impoverishes the soil, and, if *small*, lets in weeds, which together with *rest*, *bind* and *foul* the land.

The superiority of the new course of crops is still farther evinced, by a series of conclusive experiments made by Mr. A. Young. He divided three acres of old upland pasture into 56 squares, of 9 rods each, which he planted with beans, peas, wheat, barley, oats, cabbages, clover, potatoes, &c. in different rotations, with various success. From these comparative trials he drew the following practical inferences, which we recommend to the serious attention of our agricultural readers:

1. That potatoes exhaust the land more than any other fallow crop hitherto tried; and, in some courses, to a greater degree than barley, or even wheat.

2. That potatoes will not yield a tolerable crop, even on old lay newly broken up, without the aid of dung, and not a profitable one, even with it.

3. That barley, beans, and oats, succeed much better than wheat, after potatoes.

4. That beans are the most valuable fallow-crop on new land of this quality.

5. That the preservation of the fertility of old turf depends much on the number of bean-crops introduced; as, the more frequently they are planted, the better the succeeding crops of white corn will be: and three successive years of beans are attended with an extraordinary produce of wheat.

6. That beans and barley, and beans and wheat, alternately, are both courses of great produce and advantage.

7. That the introduction of beans, in bad rotations, tends to remedy the evil of such courses.

8. That successive crops of white corn destroy the fertility, which different rotations will preserve in new ground; and that three such crops will render the land extremely foul and unprofitable.

9. That the two most productive courses are beans and barley, alternately; the former being the most abundant, but the latter the most

profitable, from the saving of tillage.

10. The four crops of beans, and one of wheat, even with the drawback of one year's cabbages, is the third course in profit; and the land will be left in such order, as to make it perhaps the first.

11. That the most unproductive, and in a still greater degree, the more unprofitable courses, are those in which turnips, cabbages, and potatoes most frequently occur.

12. That, on such new land, oats are the best white grain that can be sown, as they yield very extraordinary and valuable crops.

The same intelligent cultivator, consequently recommends the following course, which is calculated to prove the most profitable:

1. Beans.	5. Beans.
2. Oats.	6. Oats.
3. Beans.	7. Clover.
4. Oats.	8. Beans.
9. Wheat.	

The profit of beans in every rotation, by which the soil is not exhausted, is decisive; and oats are far more productive than either barley or wheat, while the old turf is decaying: because clover will revive the fertility, which beans in the 8th year will not lessen; and wheat cannot fail, after those two successive ameliorating crops, to yield a plentiful harvest. In justice to Mr. YOUNG, we shall observe, that he proposes such a rotation only for *new* land, as there are circumstances that would render it inapplicable to other fields ....For many interesting particulars relative to this great object, we must refer the reader to the 23d vol. of *Annals of Agriculture*, in which he will find it minutely and perspicuously treated.

[The rotation of crops must necessarily be regulated: 1. by the *climate*: 2. by the *soil*: 3. by the qualities of the crops, whether exhausting or ameliorating. At present, we can only be expected to speak of the rotation of crops in Pennsylvania, east of the Alleghany mountain, and even here, no uniform system has been yet approved of. Dr. MUHLENBERG, of Lancaster, after many rotations, has adopted the following:

1. "*Mayz*, (Indian corn) fallow perhaps with some flax, wheat, rye, clover, clover; after six years begin as before. The weeds are so rank as to render a fallow indispensible.

2. *Mayz*, flax and oats, clover, clover, wheat, rye.

3. *Mayz*, oats, rye, clover, clover, wheat."

The following is very frequently adopted: potatoes, barley, wheat, clover, clover, wheat.

Another: buck-wheat, ploughed in when in blossom, barley or wheat, clover, clover, wheat or oats.

In Pennsylvania, quick renewals of clover in entire fields are much approved of, and with various manures, especially GYPSUM, are found to enrich a barren soil. As before noted, under the article CLOVER, this invaluable grass is cut either the first or second season, then once ploughed in with the remains of the old stubble, the ground levelled, and wheat or barley sown.

The following system of rotations for a grass farm, was drawn up by Mr. BORDLEY of Philadelphia, for a friend who intended to retire to the country, upon a *clay soil*, rather impoverished.

A recurring rotation of crops, is the completion of as many years, crops of the same kinds, in regu-

gular changes from field to field, as there are fields cultivated; and which form a cycle, or round of such crops, as will recur in the same order for ever. But where, for instance, there are seven fields, if the farmer proceeds on the designed system, yet stops short of the seven years, it is not a rotation, but is only a course of crops for so many years, as it has been continued; for there is no cycle or round of crops completed.

DESIGN.

No kind of grain is to be cultivated. No horse, ox, cow or other beast is to graze on pasture. They are to be kept up the year through. There then will be little need of division fences. Such as are on the place may be removed, and the out-fence be made perfect. The fields will then be under one general inclosing fence; and exhibit a beautiful unit of grass, unbroken by fences, but dotted here and there with clumps of trees, and marked off in equal divisions by headlands, or turnings.

The live stock may be two oxen for a plough, harrow, roller, and cart, occasionally, four oxen in harness, for a waggon, the journeys being short, and two good cows, besides carriage or saddle horses.

Some ground for potatoes, a kitchen-garden, and experiments will be wanted: therefore, eight acres are reserved; which are to have no connection with the other fields; nor are ever to grow any corn or grain, which would require the thresher to be introduced. These 8 acres may contain a garden for the market, or for pleasure, according to the views of the owner.

In the first year, plough up all the arable land deep as the soil will admit of. Then sow buck-wheat, and plough in the plants, before they produce seeds. Repeat this, for protecting the fallow from excessive exhalation: and for adding a manure to the soil as often as the buck-wheat is ploughed in. On the fields A, and B, lay a quantity of rich dung: best done in the fall, on the last turning in of the buck-wheat. Sow these and the other four fields with rye for giving *hay*. When hereafter, clover and timothy seeds are sown, rye will first shelter these grasses in their tender state, and then be cut and cured into *hay*. In the second year, give dung also to C and D fields; and in the third, to E and F fields. I have not indeed ever seen rye-hay, but have heard farmers say, it is good in quality, and the crop great.

To *dung* the whole in the first year might be beyond your power, or be very inconvenient. Therefore, a third part is proposed to be dunged in each of three years; which, however, rather disadvantageously postpones, till the seventh year, the commencement of the desired course, for giving yearly, two fields of rye-hay, two of clover, and two of timothy.

For effecting rotations of recurring crops, four articles of produce, if *all annual*, would require four fields. If of *three articles* of crop, *one* is *annual*, as in the subsequent table, and *two* are *biennial*, then six fields are requisite. With fewer fields, the system would be defective, and the round of crops could not be continued. For instance, if these articles annual and biennial, as above, were cultivated in only three fields, in the seventh and eighth years, there would be

no clover. If of *two* articles of crop, *one* is *annual*, and the *other triennial*, then four fields are requisite.

The first six years of the above design, are rather preparative to the intended round of crops. (See the table.) It is the seventh year, which enters upon the designed and proper recurring rotation of *crops*, *manuring*, and *work*. A regular system of recurring crops and business in husbandry exists on the principles of the spiral line, as well as on the circle. This is illustrated by reading the plan diagonally, from A field in the seventh year, downward through B field 8, C field 9, &c. to F field in the twelfth year inclusive; being in all 6 fields, and 6 years; all whereof direct to "mow timothy, plough in timothy, dung, sow rye." The like of the other articles. By wrapping the paper plan or table round a cylinder, the spiral line of crops is clearly understood. The plan is also advantageously read directly downward, taking any one field at a time; and also laterally through all the fields of either year.

Though the first six years in the system exhibited in the table, give crops except the first year, yet they are not according to the designed variety; as they are mostly in rye-hay, instead of two fields of *rye*, two of *clover*, and two of *timothy*. But the proper course being once entered on, the intended crops will regularly recur as long as you please to continue it.

Manurings also recur in rotation and spiral order; and being frequent are applied in less quantities at a time than would be requisite after the usual lengthy delays in renewing them: and also applying them *frequently* in moderate quantities, approaches nearer to the economy of nature, which constantly commits to the earth the food of plants, or the means of obtaining that food in moderate portions: not in gluts to surfeit, nor at distant intervals of time which might starve the plants.

Not only the *crops* and *manurings*, but the *ploughings* and the work in general, recur orderly and of course, without the hazard of a wrong bias or fallible reasoning leading you into error, confusion, or ill-judged and irregular practices and courses. Such are the important advantages, which systematic husbandry has over random or common practices.

Your live stock will give the dung requisite after the third year: and beeves bought and soiled on cut green grass, will add to the dunghill.

Rye is sown in September or October. Clover in Maryland, in March, by strewing the seeds on the ground which is already sown with small corn; or in July on buckwheat, without any attempt to cover them. The dilated state of the ground, and the motion given to its particles by the alternate light frosts and thaws of March, and winds or dews of July, suffice for the growing of the seeds; and the sun is too feeble to injure them, sheltered as they are by the buckwheat or other corn plants; yet in some places it may be well to run a light roller over it: some farmers in Pennsylvania of late, prefer strewing clover-seed on their wheat fields in April. For the climate of Maryland, about the 20th of March seems the best time.

Timothy sown in the spring, would sometimes be injured by drought, and heat of the mid-sum-

mer sun, whilst in its feeble state, on the loss of its grain shelter. On the other hand, though timothy is more perfect from being sown on grain in autumn, yet it sometimes overgrows and injures the crop of winter grain. But when the grain is sown for the purpose of hay and shelter only, the objection is avoided: and autumn is generally the preferable season for sowing timothy seed. On rye being sown in September, and harrowed in, immediately before the soil can be settled down by time or rain, strew the timothy seed over it, and either roll it in or leave it to the crumbling of the soil in its settling with the aid of wind and rain; which by experience, is found to be generally sufficient.

Clover and *timothy* grow admirably well when sown in July, on buck-wheat. The seedling plants are thus well sheltered against the scorching sun, and will have a good length of time for growing strong for withstanding the winter frosts.

Two years are the most that clover ought ever to be continued in the ground. Timothy would continue good several years longer.... But this is of no consideration in a rotation course, which does not well admit of any grass or clover being continued two years on the ground: and it is of great advantage to turn up the ground, shift its surface, and bury the sods of grass. The expence of seed for renewing grass is thought too much of by farmers. It is a trifle, when opposed by the advantages gained.

The following rotations further illustrate the aforementioned principles, and shew other varieties of crops.

	Clover with Rye.	*Timothy with rye.*	*Clov. & Tim'y witht. sheltr.*
1st round of crops.	RCC CRC CCR	RTTT TRTT TTRT TTTR	CTCT CTCT TCTC TCTC
2.	RCC CRC CCR	RTTT TRTT TTRT TTTR	CTCT CTCT TCTC TCTC

The want of a sheltering crop to the young clover and timothy in most years might prove very material.

In the instances where timothy is proposed, *orchard grass* may be substituted. In some particulars they have a similarity of character: in others they materially differ. Both are blade or spire grasses, tufty and fibrous rooted. Their principal difference is in the forwardness of their spring growth, the time of their arrival to maturity, and their continuance towards winter. *Orchard grass* comes early, is matured soon, and continues green late in the season; just as clover does. Timothy is late in its coming in the spring, and late in ripening.

It is not uncommon in the ordi-

nary husbandry, to sow lots of ground with clover and timothy seed mixed. But a better companion for clover is orchard grass. Yet in a rotation system, clover ought not to admit any kind of grass seeds to be mixed with it.

When clover is grown, it must be cut sooner than is usual. Timothy growing with clover, is cut with it, in a young and very imperfect state. In this case the clover gives matured hay: the timothy a crude food containing little nourishment. Horses prefer ripe, full grown timothy in hay.

A system of recurring crops; in which one field is in meadow whilst the others are interchanging crops; By Mr. Bordley.

To farmers approving of the new methods of cultivation, but who contend that the arable grounds ought to lay out a number of years at perfect rest from being broken up or yielding any thing else than grass, the following design is submitted; the rather, as a permanent meadow of spireleaved grasses, certainly, is very advantageous; especially if it be only cut for hay and never trod close in pasturing, except it may be, discreetly, the after math, and also that it be supported by manures. Any sound land may be brought to yield crops of grass: but clover, requiring renewal every second year, is insufficient for a standing or permanent meadow.

The present design allows a seventh of time in grass; and is accompanied as well with the system of recurring rotations of crops, as with estimates and observations which may afford useful intimations.

Fds. 30 acres timothy, in *standing meadow*, during the years in which the other fields are under a change of crops.
30 Maize. About the last of July, buckwheat and clover seeds are sown on it; the maize having been previously *manured*, ploughed, harrowed, occasionally rolled, and left quite level without the least hill or ridge*.
30. Clover.
30. Wheat.
30. Clover. Gypsumed in the spring; if not before on the clover sown on the maize.
30. *Rye* and barley. A top dressing with raw lime stone, or shells pulverized: 6 or 8 bushels an acre.
30. *Turnips* and *potatoes*, 18 acres. *Beans* or *peas* 12 acres.
30. Buckwheat ploughed in: and in July, sown for crop. Timothy seed on it.

———

240.
20. Homestead; including mansion, farm yard, stack yard, orchard, &c.
260. Acres, arable and meadow.

* New mode of cultivating maize.

Illustration of the whole round of crops during 7 years; with one field continually in meadow, during the time of the rotation.

	A	B	C	D	E	F	G	H	
7 yrs	Tim'y.	Maiz	Clov.	Wheat	Clov	Rye	Potat	B w't	8 Fds.
1791 2.	Tim'y	C	W	C	R	P	B	M	
3.	Tim'y.	W	C	R	P	B	M	C	
4.	Tim'y.	C	R	P	B	M	C	W	
5.	Tim'y.	R	P	B	M	C	W	C	
6.	Tim'y.	P	B	M	C	W	C	R	
7.	Tim'y.	B	M	C	W	C	R	P	

The crops of the first year of this table are particularly treated of above, where it is seen that the rye field contains some barley; the potatoe field, some turnips, and beans or peas: the maize field also gives buckwheat. The buckwheat field, which is next after the potatoe field, is sown with timothy seed, for giving a new meadow next year, which like the former is to stand out the new rotation of crops. This new meadow will be on field B. the next on field C. and so on.

In designing a recurring round of crops, their succession is to be tried on a plan or table, drawn for the purpose, by reading the table and slightly marking it with a pen diagonally downward, and seeing that they run the same throughout; and moreover that there are not more nor less in the number of each sort in a year, any where in the table, than are in the first year among all the seven fields, or are in B field, during the seven years' rotation. The table answering in these particulars warrants a true, orderly course of crops and employment, which will recur for ever; but as the farmer may, in future choose to alter it."

The following is the produce of thirty-five acres of ground, 14 acres of which was ploughed ground, farmed by Mr. Wm. Johnson near Frankford, some years since. The crop was measured by a committee appointed by the *Farmer's Society of Frankfort*, which existed at the time.

170 ½	bushels barley.	
139	do.	rye.
56	do.	wheat.
256 ½	do.	buckwheat.
180	do.	Indian corn.
50	tons of hay.	
20	do.	pumpkins.
250	bushels potatoes.	
100	do.	turnips.
½	acre flax.	

It will no doubt be unniversally admitted that the above crop is not exceeded for variety, or abundance by any on record. Mr. J. was quoted above under the article CORN: this able farmer now resides in ABINGDON, Phil. county.]

CROSS-WORT, or Mugweed, *Galium cruciatum, v. Valantia cruciata*, L. an indigenous perennial plant, growing on hedge-banks, and in meadows. It produces yellow flowers which blow from May to July, and are succeeded by seeds. A decoction of this plant in wine has been recommended as an excellent vulnerary and detergent, and is said to be of great efficacy in attenuating and expectorating tough humours....-The bones of animals, fed on the roots of the cross-wort, acquire a red tinge; and wool may be died of a similar colour, both by the roots and leaves.

CROUP, or HIVES, a violent inflammation of the throat in children under twelve years of age, prevalent chiefly on the sea-coast, in cold and wet seasons. It is attended with a peculiar croaking sound of the voice; a sense of straitness about the throat, difficult breathing, and fever.

If the croup be not speedily relieved, it obstructs the passage of the air, and suffocates the patient. Hence the legs ought to be immersed in warm water, and afterwards mustard with vinegar, or horse-radish, applied to the soles of the feet, the neck, or between the shoulders. Laxative clysters should also be administered, without delay, and the child be kept cool rather than warm, and receive no other than vegetable food and diluent, slightly acidulated, drink. No medicines can with safety be given *internally*, without medical advice; but a dram of asafœtida, camphor, or a few spoonfuls of the expressed juice of garlic, may be dissolved in each injection, which should be repeated every four or six hours.

[The croup is a very common and often fatal disease in the U. States. Where, however, it is early attended to, a cure may be frequently effected. Children under twelve years are most subject to it: but instances occur of grown persons being attacked by it, upon the translation of a disease from some other part of the body to the throat. In children the disease comes on, like a common cold, which frequently occasions an unfortunate delay on the part of the parent: the cough is dry, and hoarse; the peculiar *croaking noise* mentioned by DR. WILLICH characterises the disease. It frequently also comes on, in the night time, suddenly, and sometimes terminates its career in twenty four hours from the first hour of indisposition. Dissections prove that the cause of the disease is a preternatural membrane in the *trachea* or windpipe commencing from above, and extending down several inches. The most certain remedy for the complaint is an emetic joined with a smart dose of calomel, which may be repeated every four hours during the first day, should the disease be violent. It ought to be

noted, that a larger dose of the medicine will be required to produce an effect, than in common cases. A child of two years old has taken nine grains of tartar emetic, before a vomiting came on, which brought up the membrane almost entire, having nearly the circular form of the windpipe. *Calomel* should also be freely given, during the continuance of the symptoms. A child will take greater doses of this medicine, without injury, than many grown persons. *Bleeding* is often highly beneficial, and where there is a sudden attack, ought not to be omitted. Blisters applied to the throat are also useful auxiliaries in violent cases: on the removal of the blister, the part may be dressed with mercurial ointment made without turpentine. Dr. ARCHER, of Maryland, discovered the great utility of the *Polygala Seneka*, or Seneka snake root, in this disease, and speaks with confidence as to the general good effects produced by it. The decoction of the root, is the manner in which he generally gives it; the strength must be determined by the physican; it must be so strong, as to act sensibly on his own mouth and throat in exciting coughing, &c. for in this disease the larynx (mouth of the windpipe) in a great measure loses its natural sensibility. Half an ounce of the root of seneka, bruised, and simmered in a close vessel, in half a pint of water, until reduced to four ounces, will probably in most cases be sufficiently strong. A tea-spoonful of this to be given every half hour, or hour, as the urgency of the symptoms may demand, and during these intervals a few drops occasionally, to keep up a sensible action of the medicine in the mouth and throat, until it act as an emetic, or cathartic; then repeated in small quantities, and so frequently as to keep up a constant stimulus in the same. By these means, in the course of two, four, six, or eight hours, a membrane is oftentimes discharged by the mouth, one, two, and three inches in length; sometimes it is swallowed and voided by stool. Patients who use the medicine should not be permitted to drink any thing whatever, for some minutes after each dose. The reason must be obvious to all. The powder has lately been used by Doctors ARCHER and Son, in doses of four or five grains, mixed in a little water, with effects equally pleasing as the decoction, and more so, unless the latter have been carefully prepared.]

CROUT, SOUR CROUTE, or KROUTE, a preparation of cabbage, originally invented by the Germans. See *Sauer Kraut*.

CROW, the Common, or Carrion-crow, *Corvus corone*, L. a bird sufficiently known: it bears a strong resemblance to the raven, both in its nourishment and other habitudes. The food of crows is carrion, or similar refuse, and also insects. They are sometimes very destructive in corn-fields, by devouring vast quantities of grain; and were formerly so numerous, and their devastations so great, as to be considered an object worthy of parliamentary redress. An act was, therefore, passed for their destruction, in the 24th of HENRY VIII. by which every hamlet was enjoined to provide crow-nets for ten years, and all the inhabitants were obliged to convene and consult, at stated times during that period, concerning the proper means of

exterminating these birds. The most successful method of destroying them appears to be the following: A kind of table is to be formed between the branches of a large pollard oak; on which may be laid carrion, or any other meat, prepared with pulverized *nux vomica*, a poisonous drug brought from the East Indies. By previously accustoming the crows to resort to the place and food, without any addition, they will be induced to take it readily when thus poisoned, and consequently be destroyed. But, though crows occasionally commit depredations in corn-fields, they also devour a multitude of locusts, caterpillars, and other insects (see CHAFFER). Farther, they may in another respect, be considered as the natural planters of many trees; the kernels of which they disseminate upon the earth; and thus, clearly evince that providential wisdom, which has endowed them with an instinct equally beneficial to themselves, by securing a future supply, and by rendering them conducive to the welfare of mankind.

CROW-FOOT, or *Ranunculus*, L. a genus of plants consisting of 53 species; but only 15 are indigenous, of which the following are the principal:

1. The *flammula*: See Lesser SPEARWORT.

2. The *lingua*: See Great SPEARWORT.

3. The *ficaria*, or Lesser Celandine: See PILEWORT.

4. The *auricomus*, or Sweet Wood Crow-foot, or Goldilocks, which grows in woods, groves, and hedges; produces yellow flowers in April and May; and is so inoffensive that the whole plant may be eaten as spinach; the blossoms are much frequented by bees.

5. The *sceleratus*, or round-leaved Water Crow-foot; thrives in shallow waters; and produces small yellow flowers from June to August. The whole plant is so very corrosive, that beggars are said to employ it for ulcerating their feet, which they expose in that state to excite compassion. Internally taken, this vegetable, especially the seed-bud, is extremely poisonous to man and cattle; hence it ought to be carefully extirpated from meadows. It is, however, eaten by goats; but refused by cows, horses, and sheep.

6. The *bulbosus*, or Bulbous Crow-foot, also called Butter-flower, Butter-cups, &c. It grows on meadows and pastures, produces yellow flowers in May, and turnip-shaped bulbous roots, which like the blossoms and leaves, are so corrosive, that they speedily blister the skin: on this account they deserve, for many reasons, to be substituted for the Spanish fly.

[This is a common and very troublesome weed in our meadows, and should be carefully extirpated. It propagates itself with great rapidity.]

7. The *acris*, or Upright Meadow Crow-foot: See BUTTER-CUP.

8. The *arvensis*, or Corn Crow-foot, is an annual plant growing in corn-fields; and bearing small pale yellow flowers, which blow in the month of June, and are succeeded by flat prickly seeds. This noxious weed is particularly luxuriant on damp soils, and most severely exercises the patience of the farmer. The only effectual method of extirpating it is, to *fallow* the soil infested with it. In Italy, cows, horses, and sheep, are said to eat

it greedily, though it is so acrid as to poison the latter: 3 ounces of its juice killed a dog in four minutes. As it thrives chiefly in corn-fields, where cattle are excluded, its deleterious qualities are from this circumstance less known in this country. BECHSTEIN informs us, that in Germany the milk of cows becomes tinged with blood, when feeding on the fresh leaves of this plant.

9. The *aquatilis*, or Water Crow-foot, which grows in ponds and ditches, where it produces white flowers, with yellow spots at the base, from May to July. In the 5th vol of "*Transactions of the Linnæan Society*," we are informed by Dr. PULTNEY, that the cottagers in the vicinity of Ringwood, on the banks of the Avon, support their cattle almost entirely with this plant, which is devoured with such avidity, that it is deemed unsafe to allow them more than a certain portion. The cows thus fed, continue in excellent condition, and yield a sufficient quantity of good milk. These animals are so partial to the Water Crow-foot, that, excepting the scanty pittance they procured on the adjoining heath, five cows and one horse had not consumed more than half a ton of hay in one year. Hogs likewise eat this vegetable, on which they remarkably improve: according to Dr. P. it is not necessary to allow them any other food, till they are put up to fatten.

CROW-NET, a contrivance that may be used in the day time, for catching wild fowl in the winter season.

This net is made of double thread, or of fine pack-thread; its meshes should be two inches wide, its length ten yards, and its breadth three; it should also be verged on the side with strong cord, and stretched out very stiffly on long poles prepared for that purpose. When a person arrives at the place where the net is to be laid, he should open and spread it out at its full length and breadth. The lower end should next be fastened along the ground, so that it can only be moved up and down: the upper end must be extended on the long cord, the extremity of it being previously staked to the earth, by another at the distance of about five yards from the net, which must be placed in a straight line with the lower edge of the latter. The other end must be at least 25 yards distant, so as to extend to some natural or artificial shelter, by means of which a person should conceal himself from the fowl; otherwise no success can be expected. The net must, likewise, be placed in such an exact order that it may admit of being played on the birds, by the least agitation of the cord, which must be expeditiously pulled, lest the latter escape. This net may be advantageously employed for taking pigeons, crows, or other fowl, on corn-fields newly sown, as in also stubble-fields, provided the straw be long enough to hide the apparatus from the acute sight of the feathered tribe.

CRYING, the act of weeping, usually accompanied with tears; but this term is more generally applied to the squalling of infants.

It is remarkable, that the first symptoms of human life are uniformly those of loud cries: hence, superstitious persons are apt to imagine that such are the prognostiscs of future misery. Those who reflect upon the previous situation of the new-born, who is now sur-

rounded by a different element, and placed in a much colder temperature, may easily account for this natural phenomenon. Instead, therefore, of being alarmed by those plaintive expressions, we ought to rejoice; because they indicate expanded lungs, and vital action. In a similar manner, judicious persons will consider the frequent and almost instinctive cries of children, as they advance in age, unless arising from accidental and obvious causes. The conduct of those mothers, who from an excess of tenderness, and of those nurses, who from too much officiousness, exert their utmost endeavours to relieve the clamorous noise of infants (often by the most absurd and pernicious means), equally deserve to be censured. Admitting that in some, nay, in many cases, it proceeds from a concealed pain, yet experience has sufficiently evinced, that these very cries alleviate, and often totally remove, such painful sensations as are produced by flatulency, gripes, &c. Nevertheless, when children continue in an uneasy state for a considerable time, violently drawing their legs towards their belly, we may conclude that they are afflicted with *colic* pains; or, if they suddenly move their hands and arms to their face, while crying, we may attribute it to difficult *teething*; and, if other morbid symptoms accompany these loud complaints, especially if repeated at certain periods of the day, we ought, in such cases, by no means to neglect them, but endeavour to ascertain the efficient causes.

Hunger is frequently assigned as a motive for *crying*, but it is not always really so; the latter is the sole language of infants, by which they manifest all their sensations and wants. If they cry without intermission, it may be considered as an indication of the return of appetite, and they ought to be satisfied either by the breast, or other means; but, if they vociferate quickly and abruptly, it may be reasonably supposed to proceed from a sense of pain. Circumstances of this nature claim the most diligent attention of mothers and nurses. We therefore earnestly enjoin them, particularly the former, to study the exact distinction of the different sounds expressed by their infants; as the result of such enquiries would greatly enable the medical assistant to ascertain, with more precision, the *true* cause of infantine diseases.

CRYSTAL, a species of stone, of various colours, of which that most generally known is the *pebble-crystal*, or *sprig* or *rock-crystal*, as it is usually called. It is common in this country, and is frequently cut into chandeliers, vases, lustres, and other ornamental articles.

[Some beautiful specimens of crystal have been found in the U. S. One which the editor saw, came from near Bethlehem, in Northampton county, Pennsylvania.]

CRYSTALIZATION, a kind of congelation of essential, fixed, and volatile salts, which, after evaporating the greatest part of their humidity, are left to dry, concrete, and shoot into crystals.

Opaque stones, pyrites, and minerals, when regularly formed, are said to be crystalized, as well as transparent salts and stones. Ice is a true crystalization, consisting of long masses flattened on one side, and joined together in such a

manner, that the smaller are inserted into the sides of the greater, making uniformly the same angle. Melted metals, and other bodies, such as wax and starch, which become solid when congealed, assume a regular arrangement, if gradually cooled.

In order to perform this process in perfection, the evaporation should be gentle, and not continued longer than till some drops of the liquor, poured on a glass plate, discover filaments of crystal. As soon as this appears, the vessel is to be immediately removed from the fire into a cooler place, and covered with a cloth, to prevent the access of cold air, which would form pellicles. From a variety of experiments, we have observed that crystalization may be remarkably promoted, by throwing into the vessel a few small crystals of the same nature.

Another method of crystalizing salts, is, by adding to a solution of salt a substance which does not act upon the latter, but which has a greater affinity with the water, and will serve to deprive the salt of a portion of that liquid which holds it in a state of solution. Spirit of wine will effect this purpose in many salts; and, if judiciously added, will cause them to separate freely from the menstruum, or fluid, and form large and beautiful crystals.

Salts have this peculiar property, that, however minutely they may be divided, when formed into crystals, they will reassume their proper figures; so that they may, with equal facility, be divested of their saltness and their figure. Crystalization, therefore, is one of the most important agents in chemistry, as it enables us to discover compound solutions of salts; to ascertain their purity or impurity; and, lastly, to separate different salts from each other.

CUCKOW, the COMMON, or *Cuculus canorus*, L. is a native of Africa, whence it visits this country about the middle of April, and continues here till the end of June, or beginning of July. It is about 14 inches in length, 25 in breadth, and weighs generally about 5 ounces.

This is, perhaps, the most remarkable of the feathered tribe; as it never pairs, nor hatches its own young, but drops *one* of its eggs in the nests of different birds, especially those of the hedge-sparrow. As soon as the eggs are hatched, the young cuckow, with his broad hollow back, turns out the other eggs, as well as the young sparrows. This inimical conduct is analogous to what daily happens in human life; but it is now ascertained, that the cuckow does not ungratefully destroy its foster parent; on the contrary, it soon leaves the nest, as its growth is uncommonly rapid, and its appetite extremely voracious, its food consisting almost entirely of animal substances, such as flies, beetles, snails, grasshoppers, caterpillars, &c. This bird may be, and frequently is, brought up tame, so as to become domesticated. In this state, it will eat bread, milk, fruit, insects, eggs, and flesh, whether dressed or raw. When fat, it is esteemed by epicures as a delicious morsel, being little inferior to the land-rail.

Although naturalists have formed various conjectures, to account for the peculiar habit of the cuckow, in abandoning its own eggs, yet, we think, such practice is far from

being as unnatural as it has been commonly stigmatized. This sagacious creature lays her eggs at intervals of six or eight days; and, therefore instinctively deposits them in the nests of other birds, because no fowl could support itself for so many weeks, while brooding, nor would it be possible for the cuckow to maintain her voracious offspring.

CUCKOW-BREAD. See Common Wood SORREL.

CUCKOW-PINT. See WAKE ROBIN.

CUCUMBER, or *Cucumis*, L. a genus of exotic plants, consisting of fourteen species, of which the following are the principal:

1. The *Sativa*, or common Cucumber, which is reared in this country, at three different seasons of the year: 1. On hot-beds, for early fruit; 2. Beneath bell, or hand-glasses, for the middle crop; and 3. On the common ground, when designed for a late crop, or for pickling. The Cucumbers gathered before April are unwholesome, on account of their being raised entirely by the heat of dung, without the aid of the sun: those growing after that month, are more salubrious, and are cultivated in the following manner: Towards the latter end of January, a quantity of fresh horse-dung should be procured, with the litter among it, to which a small portion of sea-coal ashes should be added. In the course of four or five days, the dung begins to heat, when a little of it may be drawn flat on the outside, and covered two inches thick with good earth; over which a bell-glass ought to be placed; and, two days after, when the soil is warm, the seeds should be sown, covered with fresh mould, one-fourth of an inch thick, and the glass again set over it. This must be screened with a mat during the night, and in four days the young plants will germinate. As soon as they appear, the rest of the dung must be beaten close together into a bed for one or more lights, which should be three feet thick, and covered three inches deep with fine fresh earth; the frame is then to be put on; and, during the night, or in bad weather, sheltered with mats. When the soil is hot enough, the young plants must be removed into it, and set at two inches distance, the glasses being occasionally raised, to admit fresh air, and also frequently turned, to prevent the wet steam of the dung from dropping down on the plants. These ought to be watered at stated times, with tepid, or luke-warm water; and, as they increase in size, should be earthed up; an operation which will considerably augment their strength. If the bed be not hot enough, fresh litter should be laid round its sides; but, if it be too warm, they should be perforated with a stake, to give vent to the heat; and, as soon as the bed acquires a proper temperature, the holes are to be closed up with fresh earth. When the plants begin to shoot their third, or rough leaf, another bed should be prepared for them, similar to the first; and, when the soil is thoroughly warmed, they should be transplanted into it, in holes about a foot deep, and nine inches broad, filled with light, fine, fresh mould, laid in a hollow, circular form. In each of these holes four plants should be set, and shaded for two or three days from the heat of the sun, that they may strike root; after which time it will be useful

to expose them to the sun, and the air, as often as the weather will permit. When they have attained the height of four or five inches, they should be gently fastened down to the soil, in different directions; and the branches afterwards produced, ought to be treated in a similar manner, as it will much contribute to forward their maturity. In the course of a month, the flowers will appear, and, shortly after, the rudiments of the fruit. The glasses should now be carefully covered during the night, and the plants gently sprinkled with water, in the day time. These will produce fruit till Midsummer; and may be succeeded by a second crop, which is to be raised nearly in the same manner as the earlier cucumbers; with this only difference, that the former should be sown toward the end of March, or the beginning of April, and that it requires less care and attention.

The proper season for sowing cucumbers of the last crop, or those destined for pickling, is towards the latter end of May, when the weather is settled: they should be set to the number of eight or nine, in shallow holes, and filled up with fine earth. After appearing above ground, they need only be kept clear from weeds, and occasionally watered. Five plants are to be left, at first, in each hole; and, as soon as they have grown a little larger, the worst of them is to be pulled up, so that their number may be reduced to four: this crop will begin to produce fruit in July.

A very ingenious method (we learn from a Foreign Journal) of propagating cucumbers for several crops in succession, without sowing them, has been lately discovered by Mr. Burton, of Staineshead, Sussex. As soon as there appear several flower-buds on a plant, he bends the second or third joint of a branch below the blossom, fastens it firmly into the ground, and cuts off the capillary point of the plant. The new vegetable speedily takes root, when he separates it from the parent stock. Thus he proceeds with the most vigorous of his plants; and as each root has to supply only a few fruits with nourishment, he saves both room, labour, and time, while this process enables him to procure a constant succession of cucumbers for eight, twelve, and more months, from *one* sort, which is not so liable to degenerate, as if they were raised from a variety of seeds.

Cucumbers are a salubrious cooling fruit, and may be safely allowed to consumptive patients; as they sweeten acrid humours, at the same time are gently laxative; but, being in a considerable degree acescent, and sometimes attended with flatulency and diarrhœa, such effects may be prevented, by eating them in great moderation; or with the addition of vinegar and pepper, which counteract their natural coldness. If properly pickled (without colouring them with that poisonous metal, copper; or rendering them too acrid with stimulant spices), they are an excellent antiseptic; yet we consider them highly improper, either for children or wet-nurses.

[The fly which is often very destructive to cucumbers, melons, and pumpkins, may be killed by sprinkling a mixture of tobacco-water and red pepper over the vines.

A friend E. B. Esq. informed the Editor, that some years since, nearly all the cucumbers and me-

lon vines in New Jersey were destroyed by a fly or bug; one day he had occasion to ride past a miserable hut in the woods, and, perceiving a very flourishing patch of cucumbers; he was induced to dismount and to examine it, upon approaching the spot he found it had formerly been a *charcoal* heap. He took the hint, and by strewing powdered charcoal round about the vines when they first come up, preserves his cucumbers effectually.

Mr. J. W. of Philadelphia, informed the Editor that he enriched the ground near the trunk of a peach tree, and sowed some cucumber seed, which came up very abundantly. He pulled up all the plants but one, and permitted the vine to run up the tree. It bore 150 cucumbers. The numerous creepers with which the cucumber abounds and the result of this experiment would seem to point out *the* climbing nature of the plant, and the great advantage arising from permitting it to attach itself to a frame or tree, instead of confining it to the ground.

The seeds of melons and cucumbers are liable to run too vigorously to vine before they emit a single fruit. To prevent this, Dr. Darwin advises to wash the seeds clean from their pulp before they are put away for preservation, and to keep them three or four years before they are sown. The experienced Abercrombie (Mawes' Gardener) confirms the advice to plant seeds two, three, or four years old.

CUCUMBER ROOT. See MEDEOLA.]

2. The *Colocynthis*, COLOQUINTIDA, or Bitter Apple, which grows in Syria, and also in the island of Crete. It produces a yellow fruit, of the size of an orange, and resembling a gourd, the shell or outside of which contains a very light, white, spongy pulp, interspersed with flattish seeds. This pulp, when dried and pulverized, is one of the most violent purgatives: and though it is frequently employed for that purpose, we cannot but caution the reader against its use, which is sometimes attended with bloody stools, colics, convulsions, and ulcers in the bowels. As we are possessed of numerous native plants of similar and much milder virtues, there appears to be no necessity for employing this exotic.

CUDBEAR: See ORCHAL.

CUDWEED, or *Gnaphalium*, L. a genus of plants, comprising 72 species, of which the following are the principal:

1. The *Germanicum*, or Common Cudweed, an annual indigenous plant, which grows in barren meadows, pastures, and road-sides; and produces yellowish flowers, which blow in the month of July or August.....This plant is desiccative, and astringent; it is said to be of great service in dysenteries and hemorrhages of every kind. A decoction of it in small beer, is frequently given by the lower class of people for quinsies, in the cure of which complaint it has been found very efficacious.

2. The *Dioicum*, or Mountain Cudweed, or Catsfoot, grows on dry mountainous pastures in the North of England, Wales, and Cornwall; also on the Newmarket, Canham, Swaffham, and Stratton heaths, &c. Its white and purplish flowers blow in June and July. The late Dr. GLEDITSCH enumerates it among those plants, which he found useful in currying leather.

3. The *Arenarium*, or Sandy Cudweed, a native of Germany, which grows on sandy fields and banks; and produces fine yellow flowers through the whole summer. It deserves to be propagated in Britain, as the Japanese, according to Prof. THUNBERG, occasionally prepare their *moxa* from the down with which the whole plant is covered, and smoke its leaves for common tobacco.

[CULMIFEROUS PLANTS in Botany, such as have a smooth jointed stalk, usually hollow, and at each joint, wrapped about with single narrow, sharp pointed leaves. In some species however, the culm is entirely naked, that is, destitute of leaves.]

CULTIVATOR, is an implement of husbandry, lately invented by Mr. WILLIAM LESTER, of Northampton; for the contrivance of which, the *Society for the Encouragement of Arts* &c. in 1801, rewarded him with their silver medal. As this instrument promises to be of essential utility to agriculturists, we have given an engraved view of its construction.

Description of Mr. LESTER'S *Cultivator.*

A, is the beam.

B B, the handles.

C C, is a semi-circular cross-bar, containing several holes, by means of which the two bars D D may be placed at a greater or less distance from each other, as occasion may require.

D D, represents two strong bars, that are moveable at one end upon a pivot marked E; and extend thence, in a triangular form, to the cross-bar C C. With the former are connected the shares F, the upper ends of which are inserted through square holes, and may thus be fixed at any requisite height.

F, represents those seven shares, the lower extremities of which are shaped like small trowels, while the upper parts consist of square iron bars.

G, G, G, are three iron wheels, serving to move the machine, and which may be raised, or lowered, at pleasure.

H, an iron hook, to which the swingle-tree and horses are to be linked.

When the machine is first employed on land, the bars D D, are expanded as widely as possible: in proportion as the clods are broken, and the soil becomes loosened, they are brought closer to the centre, so that the shares occupy a smaller space, and consequently the land will be more easily reduced to powder.

The object of Mr. LESTER'S invention is, to shorten the labour at present required for breaking up stiff soils; and, as these are most effectually pulverized in dry weather, his implement is peculiarly adapted for such purpose: according to his account, he is confident that one man, a boy, and six horses, will break up as much *fallow-land* in one day, and with the same effect, as six ploughs. In some states of the soil, it will be necessary to alter the breadth of the shares; but this circumstancemust be regulated by the judgment of the husbandman; and, though the points of the shares, in consequence of such expansion and contraction of the cultivator, are slightly moved out of the direct line, yet this irregularity does not impede the progress of the implement.

Mr. LESTER'S communication is accompanied by the certificate of a farmer, in the vicinity of

Northampton, who states, that he employed the *cultivator*, in the summer of 1800, on a turnip-fallow; and believes to it be very useful for cultivating such land; that from its alternate contraction and expansion, it is calculated to work the same soil, in a rough or fine state; by which means it unites the principles of two implements in one; and he is of opinion, that it may be worked at any depth required, for the purposes of general tillage.

CURB, a chain of iron fastened to the lower part of the branches of the bridle, in a hole called the *eye*, and running over the horse's chin or beard. It consists of three parts; namely, the hook fixed to the eye of the branch; a chain of links; and two rings or mailes..... Large round curbs are the best and most easy; but due care should be taken to fix them in their proper place, a little above the beard, and neither too tight nor too slack, otherwise the bit will be of little utility.

CURB, in farriery, is a hard, callous swelling on the hinder part of the hock, attended with stiffness, and sometimes with lameness. It generally arises from hard riding, strains, blows, or kicks; and may at first be easily cured, by three or four times blistering the animal affected. If the tumor continue to indurate, the most expeditious and effectual cure will be, to *fire* with a thin iron, drawing several deep lines down the middle, from the top to the bottom, and then to apply a mild blistering plaster, which will certainly remove the defect.

CUMMIN, or *Cuminum Cyminum*, L. is an exotic annual plant, propagated in the Isle of Malta, for the sake of its seeds; which, on importation, pay the duty of 8*s.* 0¾*d.* per cwt....They have a bitterish warm taste, accompanied with an aromatic, but not agreeable, flavour; and, though esteemed good carminatives, are seldom employed in medicine. An essential oil is obtained from them by distillation, possessing all the virtues of the seeds, and reputed to be a sovereign remedy in rheumatic cases. They are likewise employed externally, both in the form of a plaster and cataplasm.....Lastly, being exceedingly grateful to pigeons, avaricious proprietors of dove-cotes sometimes incorporate the seeds with a saline earth (see PIGEON-HOUSE,) in order to allure these birds; and thus stock their pigeon-houses, at the expence of their neighbours.

CURD, is the coagulated part of milk, after the whey is separated.

As curd contains the most substantial particles of milk, it affords a rich nourishment; and especially when produced by an artificial coagulation of this liquor, while in a *fresh* state. Many nations *live* on curds: thus, in France and Switzerland, the inhabitants almost exclusively use this preparation as their only solid food; employing the whey for drink. Among the Laplanders, curd is used to correct the alkaline nature of their aliment, and likewise to serve them as a substitute for an acescent condiment.

CURDLING, the coagulation of any particular fluid, such as milk. In Tuscany, it is effected by means of artichoke flowers, instead of the rennet employed in Britain. There are, besides, a variety of substances which may be advantageously substituted for ci-

ther, especially when the whey is intended to be a cooling and antiseptic beverage; for instance, a small quantity of cream of tartar; a few drops of oil of vitriol, or spirit of salt, previously diluted in a spoonful of water, will easily coagulate the milk; after which it should be strained....See CHEESE.

CURING, a term used for preserving fish, flesh, and other animal substances, by adding certain ingredients, to prevent putrefaction. It is also effected by drying the bodies with the smoke of wood, or by rubbing them with salt, nitre, &c. See BEEF, and PRESERVATION.

CURL in potatoes. See POTATOES.

CURLEW, or *Scolopax arquata*, L. an aquatic bird, large flocks of which visit the sea-coasts and marshes, feeding on shells, frogs, crabs, and other marine insects.... In summer, they retire to the mountainous and unfrequented parts of the country, where they pair and breed.

Curlews differ much in weight and size, some weighing 37 ounces, others not 22; the largest seldom exceed 25 inches in length, and are generally from 3 to 4 feet broad, with their wings expanded. Their flesh is extremely rank and fishy, though some have highly commended it for its flavour and delicacy.

CURRANT-TREE, or *Ribes*, L. is an indigenous plant, comprising 6 or 7 species, of which the following are the principal:

1. The *Rubrum*, or common Red Currant, which is found in woods in the northern counties. It bears greenish white flowers, which blow in the month of May, and are succeeded by red berries. Its leaves are eaten by cows, goats, and sheep, but with reluctance by horses....This plant is very liable to be infested by a species of plant-louse, the *Aphis ribes*, the depredations of which change the fine green colour of the leaves, that become red, pitted, and shrivelled. The best method of exterminating these vermin is, by smoking the bushes with half-burnt wood, or sprinkling them early with decoctions of tobacco, or solutions of lime and pot-ash, or simple soap-water.

2. The *Alpinum*, or Sweet Mountain Currant, which grows wild chiefly in the county of York, and flowers in the month of May. Its fruit has a flat sweetish taste, and is only relished by children. The wood is so hard and tough, that it makes strong teeth for rakes; the leaves are eaten by sheep, goats, and horses.

3. The *Nigrum*, or Black Currant, which has woolly flowers that blow in the month of May....Its leaves are eaten by goats and horses.

The different species of currants will thrive on almost any soil; but their fruit is more savoury, when produced in a dry and open ground. They are very easily propagated, by planting slips, or cuttings, in March, upon fresh earth, which should be carefully cleared from all weeds during the spring; and, in dry weather, the young plants ought to be frequently watered. After standing about two years, they will be fit to be removed to those places where they are intended to remain; an operation which should be performed when the leaves are just decayed, so that the plants may have time to strike root before the winter-frosts. If

they are designed for *standards*, they should be planted in rows 8 or 10 feet apart, and the trees in each row 4 feet distant from each other; but the more eligible way is to train them in espaliers, where they take up less room, and their fruit acquires a finer flavour. In this state, they should be placed from 6 to 8 feet apart, and all their branches trained horizontally: the same distance is also to be allowed them, when set against walls or pales.

[The following directions for the cultivation of the currant are taken from the *Amer. Phil. Trans.* vol. 1.

Plant them round the quarters in the garden, that they may have the benefit of the manure and culture annually bestowed thereon, which will consequently make the berries large, and the juice rich. The red currant is preferable to the white, as yielding richer juice, and in much greater quantity.

Take the most luxuriant slips or shoots of a year's growth, set them in the ground about eight inches deep, and not less than 24 distant from each other; these never fail of taking root, and generally begin to bear in two years. For the rest, let them, from time to time, be treated as espaliers, (but not against a wall) observing to keep the roots from suckers and grass.

The goodness of the currant depends upon their having the full benefit of the sun and air, to maturate and give the berries a proper balsamic quality, by exhaling a due proportion of their acid watery particles.]

The fruit of the *red* and *white* currants is greatly esteemed for the table. They are nutritive, but should not be too frequently nor abundantly eaten, as they tend to produce flatulency, in persons of relaxed habits and sedentary life: hence they ought to be consumed together with other food, in which case they are emollient, gently laxative, and, in some instances, anodyne. In fevers, the juice of currants, when mixed with an equal quantity of sugar, and made into a jelly, is cooling and grateful to the stomach; being in a slight degree astringent and antiseptic.

Currant-Wine is an excellent drink during the heat of summer, especially with the addition of water. Different receipts have been given for making this pleasant beverage. We select the following, [from the *Amer. Phil. Trans.* vol. 1.] Gather the currants when they are fully ripe; break them into a tub, or vat; then press and measure the juice, to which add two-thirds of water, and to each gallon of that mixture put 3lbs. of soft sugar; agitate the whole properly till the sugar is dissolved, when it may be barrelled. The juice should not be left to stand during the night, as the fermentation ought not take place, till all the ingredients are compounded.

[Observe that the cask be sweet and clean, and such as never had either beer or cyder in them; and if new, let them be well seasoned.

Do not fill the casks too full, otherwise they will work out at the bung, which will injure the wine; rather make a proportional quantity over and above, that after drawing off the wine, a sufficient quantity may be left to fill up the casks. Lay the bung lightly on the hole, to prevent flies, &c. from creeping in. In three weeks or a month after making, the bung hole may

be stopped up, leaving only the vent hole open till it has fully done working, which generally is about the latter end of October. It may then be racked off into other clear clean casks, but experience seems to favour the letting the wine stand on the lees till spring, as it thereby attains a stronger body, and is by that means in a great measure divested of that sweet, luscious taste, peculiar to all made wines: nay, if it be not wanted for present consumption, it may without damage stand two years on the lees.

When you draw off the wine; bore a hole an inch at least above the tap hole, a little to the side of it, that it may run clear off the lees. The lees may either be distilled, which will yield a fine spirit, or filtered through flannel or sand, and returned again into the cask.

In regard to the quantity of wine intended to be made, take this example, remembering that twelve pounds of sugar are equal to a gallon of liquid.

For instance, suppose you intend to make thirty gallons; then there must be

8 gallons juice,
16 of water,

24 galls. mixture,
6 galls. prod. by sugar,

30 gallons.
24 gallons mixture,
3 multiplied by,

12 | 72 6lbs. sugar,
Equal to 6 galls. of liquid.

A common cyder press, if thoroughly clean, will do well in making large quantities; the small hand screw press is most convenient for such as make less. An extraordinary good spirit may be distilled from currant juice, by adding a quart of molasses to a gallon of juice, to give it a proper fermentation.

The following receipt was forwarded to me by a friend in whose family it has been used successfully for many years.

Take 14lbs. currants when fully ripe, 3 gallons cold water, break the currants into water and let them be therein two or three days, and stir once each day. Strain the liquor from the fruit and stalks, and add 14lbs. sugar, which being well mixed with the currant liquor, the whole may then be barrelled and left 14 days without the bung: after which bung it close and bottle at Christmas, previously adding to every 10 gallons one quart of brandy. In procuring the currants care should be taken, not to permit any unripe fruit to go amongst the liquor. The sugar should be of a good quality, or if Havanna honey was used it would be equally as well, adding about one third more in weight. If the flavour of orange peel (which is grateful in most wines of this description) is desired, a small quantity of the outer rind of the orange peel will give it a grateful flavour.

From the quantity of currants which made one barrel of wine, another friend, J. P. Esq. of Derby, calculated that one acre planted in currant bushes would produce fifty barrels of wine.]

Black Currants have a peculiar flavour, which many persons dislike: they are, however, reputed to be very wholesome, and their juice is frequently boiled down into an extract or syrup, with the addition of a small quantity of sugar; in which state it is called *rob*, and much esteemed in sore-throats

and quinsies. Some persons put black currants into brandy, for the same purpose as others do cherries; compositions that are less adapted to the benefit of health, than to stimulate the corrupted palate of dram-drinkers. An infusion of the young roots of the former, is said to be useful in eruptive fevers of the human species; and in those dysenteric distempers with which cattle are sometimes affected.

CURRYING, the art of dressing cow-hides, calves-skins, &c. The principal object in this process, is to soften and supple cow and calf-skins, which are usually employed in making upper-leathers and quarters of shoes, the covers of saddles, coaches, &c. As soon as these skins are brought from the tanner's yard, the currier first soaks them for some time in common water, when he takes them out, stretches them on a smooth wooden horse, scrapes off with a *paring-knife* all the superfluous flesh, and immerses them again. They are next put on a wet hurdle, and trampled with the heels, till they become soft and pliant, when they are steeped in train oil, and afterwards spread out on large tables, and their ends tightly secured. There, by means of a *pummel* (an instrument consisting of a thick piece of wood, the lower side of which is full of furrows, or teeth, crossing each other), the currier folds, squares, and moves the skins in various directions, to render them supple. This operation is properly called *currying*; and with a few immaterial exceptions, is that now generally followed.

After the skins are thus dressed, they are coloured, black, white, red, green, &c. which process is performed either on the *flesh* or *grain* side; that on the former, by skinners, and that on the *grain* or *hair* side, by curriers: these, when a skin is to be made white, rub it with chalk, or white-lead, and afterwards with pumice-stone. But, when a black colour is wanted, the skin must be first oiled and dried, then passed over a puff, dipped in water impregnated with iron, when it is immersed in another water prepared with soot, vinegar, and gum-arabic. Thus it gradually acquires a deep dye. and the operations are repeated till it becomes of a shining black. The grain and wrinkles, which contribute to the pliancy of calves and cows-leather, are made by the reiterated folds given to the skin in every direction, and by the great care taken to scrape off every excresence and hard place on the grain, or colour-side.....See COMFREY and TANNING.

CURRYING, a manual operation, performed on horses, with an instrument called a *curry-comb;* it may also be applied to cows, and indeed to all black cattle, that are much confined to the stall or yard, especially during the winter. Independently of the circumstance, that so useful a practice essentially contributes to the health and *kindliness* of animals, it also in a remarkable degree promotes their thriving and becoming fat.....See BULLOCK.

CURTAIN, an article of domestic furniture, consisting generally of calico, dimity, or printed cotton; which may be contracted or expanded at pleasure, and is usually appended to a bedstead, or to windows.

Curtains are at present considered more as an ornament, than as

an article of conveniency, to beds; though, in many instances, they might be easily dispensed with; especially where one person only sleeps in an apartment. These appendages certainly occasion numerous accidents happening from fire; and which often originate from the absurd and reprehensible practice of reading in bed.

Those fanciful persons who cannot sleep without curtains, ought to suspend them across chairs, so that they may not exclude the access of air, by becoming in contact with the bed, but that side, which is next the wall, may be wholly covered with the curtain.

CUTTINGS, or slips in gardening, are those branches or sprigs of trees, which are cut or slipped off, in order to be transplanted; an operation that may be effected in any moist, fine earth. The most proper seasons for this purpose are the months of September, October, March, and April; but great care ought to be taken that the sap be not too abundant in the top, lest the *cut* decay, before that part which is in the ground, has taken sufficient root to support it; nor should it be too dry or scanty, as the sap in the branches promotes the growth of the root, especially if it be not planted too deep. See TRANSPLANTATION.

In selecting the cuttings, those branches which have joints, knots, or burrs, ought to be cut off two or three inches below the latter, and the leaves stripped so far as they are set in the earth. Small top-branches, of two or three years growth, are the most proper for this purpose.

CUTTLE-FISH, or *Sepia*, L. a remarkable genus of the finny tribe: the bones of a particular species, called the Officinal Cuttle, are frequently thrown out by the sea on the British shore, but the fish itself very rarely.

This curious fish, when frightened or pursued, emits a black liquor, which is supposed to have been used by the ancients, instead of writing-ink. It was also esteemed by them as a delicacy, but at present is relished only by the Italians. Its porous and laminated bones were formerly employed in medicine as an absorbent; and are still kept in the druggist-shops. They are hard on one side, but soft and yielding on the other, so that very neat impressions from medals, &c. may be easily made upon them, and then serve as moulds for casting metallic figures representing the original. These bones, in a calcined state, are further useful, not only for cleaning and polishing silver, but chiefly for absorbing the acidity and tartness of wines, which, if not completely spoiled, may thus be restored to their former briskness.

[CUTLERY. The art of the cutler does not come properly within the plan of this work, but the importance of the information about to be detailed, which probably would not otherwise obtain much circulation in the U. S. has induced the editor to abridge an excellent paper by the very useful Mr. NICHOLSON, from the information of a celebrated workman, Mr. STODDART, of the Strand, London.

The following is an abridgment of the paper:

Cut steel is used for all works which do not require welding, and particularly for fine cutlery. Huntsman's is used, but it is inferior to that formerly sold under that name. The best rule is to

harden as little as possible above the state intended to be produced by tempering. Work overheated has a crumbly edge, and will not afford the wire, hereafter to be described. The proper heat is a cherry red, visible by day light. No advantage is obtained from the use of salt in the water, or cooling that fluid, or from using mercury instead of water; but it may be remarked that questions respecting the fluid are, properly speaking, applicable only to files, gravers, and such tools as are intended to be left at the extreme of hardness. Yet though Mr. Stoddart, did not seem to attach much value to peculiarities in the process of hardening, he mentioned it as the observation and practice of one of his workmen, that the charcoal fire should be made up with *shavings of leather*: and upon being asked what good he supposed the leather could do, this workman replied, that he could take upon himself to say, that he never had a razor crack in the hardening since he had used this method, though it was a very common accident before.

To heat thicker parts before the slighter are burned away, plunge the piece into pure lead, containing little or no tin, ignited to a moderate redness for a few seconds, that is to say, until when brought near the surface that part does not appear less luminous than the rest. The piece is then stirred about in the bath, suddenly drawn out, and plunged into a large mass of water. In this manner a plate of steel may be hardened so as to be perfectly brittle, and yet continue so sound as to ring like a bell.

The letting down, or tempering of hard steel, is considered as absolutely necessary for the production of a fine and durable edge. It has been usual to do this by heating the hardened steel, till its bright surface exhibits some known colour by oxidation. The first colour is a very faint straw colour, becoming deeper and deeper by increase of heat, to a fine deep golden yellow, which changes irregularly to purple, then to an uniform blue, succeeded by white and several faint repetitions of these series. It is well known that the hardest state of tempered instruments, such as razors and surgeon's instruments, is indicated by this straw colour, that a deeper colour is required for leather cutters' knives, and other tools that require the edge to be turned on one side; that the blue which indicates a good temper for springs, is almost too soft for any cutting instrument except saws, and such tools as are sharpened with a file, and that the lower states of hardness are not at all adapted to this use. But it is of considerable importance, that the letting down or tempering, as well as hardening, should be effected by heat equally applied, and that the temperature, especially at the lower heats, where greater hardness is to be left, should be more precisely ascertained than can be done by the different states of oxidation. Mr. Hartley first practised the method of immersing hard steel in heated oil, or, the fusible compound of lead five parts, tin three, and bismuth eight; oil is preferable to the fusible mixture for several reasons. Mr. Nicholson gives an account of the temperatures at which the several colours make their appearance upon hardened steel, while floating at the surface of the fusible mixture.

The cutting instrument being

forged, hardened, and let down or tempered; it is ground upon a grindstone of a fine close grit, called a Bilson grindstone, and sold at the tool shops of London at a moderate price. The cutlers use water, the face of the work is rendered finer by subsequent grinding upon mahogany cylinders, with emery of different fineness, or upon cylinders faced with hard pewter, called laps, which are preferable to those with a wooden face. The last polish is given upon a cylinder faced with buff leather, to which crocus, or the red oxide of iron is applied with water. This last operation is attended with considerable danger of heating the work, and almost instantly reducing its temper along the thin edge, which at the same time acquires the colours of oxidation.

The setting now remains to be performed, which is a work of much delicacy and skill; the tool is first whetted upon a hone with oil, by rubbing it backwards and forwards. In all the processes of grinding or wearing down the edge, but more especially in the setting, the artist appears to prefer that stroke which leads the edge according to the action of cutting, instead of making the back run first along the stone. This proceeding is very judicious; for if there be any lump or particle of stone, or other substance lying upon the face of the grinder, and the back of the tool be first run over it, it will proceed beneath the edge, and lift it up, at the same time producing a notch. But on the other hand if the edge be made to move foremost, and meet such a particle, it will slide beneath it and suffer no injury. Another condition in whetting is, that the hand should not bear heavy; because it is evident, that the same stone must produce a more uniform edge if the steel be worn away by many, than by few strokes. It is also of essential importance, that the hone itself should be of a fine texture, or that its siliceous particles should be very minute. Mr. Stoddart informs me, that there are no certain criterions by which an excellent hone can be distinguished, from one of ordinary value, excepting those derived from the actual use of both: that the Turkey stone cuts fast, but is never found with a very fine grit: that the yellow hone is most generally useful, and that any stone of this kind requires to be soaked in oil, and kept wet with that fluid, or otherwise its effect will be the same as that of a coarser stone under the better treatment: and lastly, *that there is a green hone found in the old pavement of the streets of London, which is the best material yet known for finishing a fine edge.*

The grind stone leaves a ragged edge, which, it is the first effect of whetting to reduce so thin, that it may be bended backwards and forwards. This flexible part is called the wire, and if the whetting were to be continued too long, it would break off in pieces without regularity, leaving a finer, though, still very imperfect edge, and tending to produce accidents while lying on the face of the stone. The wire is taken off by raising the face of the knife to an angle of about 50 degrees with the surface of the stone, and giving a light stroke, edge foremost alternately towards each end of the stone. These strokes produce an edge, the faces of which are inclined to each other in an angle of about 100 degrees, and to which the wire is so

slightly adherent, that it may often be taken away entire, and is easily removed, by lightly drawing the edge along the finger nail. The edge thus cleared, is generally very even ; but it is too thick, and must again be reduced by whetting. A finer wire is by this means produced, which will require to be again taken off, if for want of judgment, or delicacy of hand, the artist should have carried it too far. But we will suppose the obtuse edge to be very even, and the second wire to be scarcely perceptible. In this case the last edge will be very acute, but neither so even nor so strong as to be durably useful.

The finish is given by two or more alternate light strokes with the edge slanting foremost, and the blade of the knife raised, so that its plane forms an angle of about 28 degrees with the face of the stone. This is the angle which by careful observation and measurement, I find Mr. Stoddart habitually uses for the finest surgeons' instruments, and which he considers as the best for razors, and other keen cutting tools. The angle of the edge is therefore about 56 degrees.

The excellence and uniformity of a fine edge may be ascertained, by its mode of operation when lightly drawn along the surface of the skin, or leather, or any organized soft substance. Lancets are tried by suffering the point to drop gently through a piece of thin soft leather. If the edge be exquisite, it will not only pass with facility, but there will not be the least noise produced, any more, than if it had dropped into water. This kind of edge cannot be produced, but by performing the last two or more strokes on the green hone.

The operation of strapping is similar to that of grinding or whetting, and is performed by means of the angular particles of fine crocus, or other material, bedded in the face of the strap. It requires less skill than the operation of setting, and is very apt, from the elasticity of the strap, to enlarge the angle of the edge, or round it too much.]

CYDER, or CIDER, a sharp, cool, and vinous beverage, made by fermenting the juice of apples. Some connoisseurs in this liquor are of opinion, that the juice of the more delicate table-fruit is generally more cordial and pleasant than that of the wild or harsh kinds ; though others assert the latter to be in many respects preferable.

The apples should remain on the tree till they are thoroughly ripe, when they ought to be gathered with the hand in dry weather, that they may be protected both from bruises and from moisture. They are then to be sorted, according to their various degrees of maturity, and laid in separate heaps, in order to *sweat*; in consequence of which they greatly improve. This practice, however, appears to be useful only for such fruit as is not perfectly ripe, though some recommend it as being proper for *all* apples. The duration of the time of sweating may be determined by the flavour of the fruit, as different kinds require various lengths of time ; namely, from eight or ten days to six weeks. The harsher and more crude the apples are, the longer it is necessary that they should remain in a sweating state, and not only be well dried, but the rotten parts carefully pared, before they are exposed.

The utility of the sweating practice is acknowledged in all the ex-

der countries, though various methods have been adopted in following it; as the apples are piled up either in the open air, or under cover in houses. In the South-hams, a middle way has been adopted, to avoid the fermentation occasioned by piling them up in rooms, and which we recommend as the best, and most rational. Heaps of fruit are raised in an open part of the orchard, where, by means of a free air and less heat, the desired maturity is gradually effected, with an inconsiderable waste of the juice and decay of the fruit, which thus becomes almost totally divested of rancidity. And though a few apples will rot even in this manner, they are still fit for use: all of them continue plump and full of juice, and heighten in a considerable degree the colour of the liquor, without imparting to it any disagreeable smell or taste.

The fruit is then to be ground till the rind and kernels are well bruised; a process which will considerably improve the flavour and strength of the liquor, when it should be allowed to stand for a day or two, in a large open vessel. It is next pressed between several hair-cloths, and the liquor received in a vat, whence it is removed into casks, which ought to be placed in a cool situation, or in the free air, with their bung-holes open. These casks are to be sedulously watched, till the cyder *drops fine*, when it is to be immediately *racked off* from the lees into other vessels. The first *racking* is a most important operation; as cyder, which is suffered to become foul again, by missing the first opportunity of racking it when fine, will never become what is called a *prime* liquor. After the clear part has been racked off, a quantity of lees or dregs remains, which, when filtered through coarse linen bags, yields a bright, strong, but extremely flat liquid: if this be added to the former portion, it will greatly contribute to prevent fermentation, an excess of which will make the cyder thin and acid. To avoid such an accident, the casks should neither be entirely filled, nor stopped down too close; and, if the whole incline to ferment, it ought again to be racked. This latter operation, however, should on no account be repeated, unless from absolute necessity; as every *racking* diminishes its strength.

When there are no signs of any farther fermentation, the casks should be filled up with cyder of the best quality, and the bung-hole firmly closed with resin.

This method of making cyder is that chiefly followed in Herefordshire. Considerable quantities of this liquor are also made in Devonshire, where the process varies but little from that pursued in the county before-mentioned. Several farmers, however, instead of racking, *fine* it with isinglass, steeped in white-wine, dissolved over the fire, and then boiled in a quantity of the liquor intended to be fined: in this state, it is added to that in the cask. Others, instead of dissolving the isinglass over the fire, digest it in white wine for the space of four or five weeks, during which time it acquires the consistence of a jelly; a quantity of this being beaten up with some of the liquor, the whole is worked into a froth, and mingled with the rest. As soon as the cyder becomes clear, it is drawn, or bottled off, as occasion may require.

Those who are anxious to pre-

pare good cyder, ought diligently to watch every change of the weather, however slight; as the least neglect, at such times, is often detrimental to many hogsheads. In summer, the danger is much greater than in winter. There is, however, scarcely any distemper incident to this liquor, which may not, by a timely application, be easily remedied. If it become somewhat tart, about half a peck of good wheat, boiled and hulled in a manner similar to rice, may be put into each hogshead, which will effectually restore it; and also contribute to preserve it, when drawn out of one cask into another. Such a remedy is doubtless far preferable to that odious custom practised by too many cyder merchants, who put animal substances into their liquors, namely, veal, pork, beef, mutton, and even horse-flesh, for the purpose of fining them. This singular expedient, though sanctioned by the usage of ancestors, we think it our duty to reprobate; because it is fraught with mischievous effects on the constitution of those, who are doomed to drink the cyder thus adulterated. By allowing a small quantity to stand, in an open vessel, for two or three days in a warm room, the fetid exhalation of the liquor will easily discover its ingredients.

The best cyder is that made from a red-streak apple, grafted upon a gennet-moil stock. These two varieties of the apple-tree agree well together, and their trunks seldom canker, as others are apt to do, especially when the former is grafted on crab-trees. The fruit of the red-streak obtained from the former combination, is always larger and milder; and, when ripe, not only most delicious eating, but also affords a mellower liquor than the same fruit produced by the latter mixture.

Many estates where the soil is not proper for corn, might be greatly improved in value, by cultivating the different sorts of apples that are used in making cyder, which finds at all times a ready market, and requires no fuel in brewing it; besides that the labour occurs only once every year. The greater the quantities of cyder made together, the better it usually succeeds; but it will be necessary that the vessels in which the liquor is to be kept, be capacious and well seasoned. In this case, it will not only remain sound for a great number of years, but also progressively improve.

An ingenious *Treatise on Cyder*, in 4to. was published about the year 1754, in which the reader will find several pertinent instructions relative to this subject.

[It has already been said that apples thrive well in all the states of United America, except in the low lands of the maritime parts of Carolina and Georgia. In such a variety of soils and climates, apples of great diversity of taste and flavour must necessarily grow. The cyder made from these apples accordingly differs very much; but in a general way it may be safely asserted, that the cyder of the United States equals that of any part of the world.

There have been numerous receipts published to make cyder, some of which have occasioned considerable losses. A few general and important rules will be given, for insuring good cyder, and afterwards some particular directions founded on experience.

1. The first and indispensible re-

quisite for making good cyder, is to chuse perfectly ripe and sound fruit. Farmers, in general, are very inattentive to these points, but it is utterly impossible to make good cyder unless they be attended to.

2. The apples ought to be hand picked, or caught in a sheet, when the tree is shook. When they fall on the ground they become bruised, and as it frequently happens that they remain for some hours before pressing: the apples are apt to communicate a bad taste to the liquor from the bruised part.

3. After having sweated, and before being ground, the apples should be wiped, in order to remove a clammy moisture which covers them, and which, if permitted to remain, would impoverish the cyder.

4. The practice above noted to press the pumice in hair cloths is certainly much preferable to the common American custom of inclosing it in bands of straw, because the straw, when heated in the mow or stack, gives the cyder a bad taste.

5. After cyder has run from the press, it has been directed to strain it through hair sieves into a large open vat, which will contain a whole making, or as much as can be pressed in one day. When the cyder has remained in this vat a day, or sometimes less, according to the ripeness of the fruit of which it has been made, and the state of the weather, the pumice, or grosser parts of the pulp, will rise to the top, and in a few hours, or after a day or two at furthest, will grow very thick, and when little white bubbles break through it, draw it off through a cock or faucet hole, within three inches from the bottom, that the lees may quietly remain behind. This operation is of great importance, as the sinking of the feculent matter would greatly injure the liquor.

6. On drawing off the cyder from the vat, it must be tunned into clean casks, and closely watched, to prevent the fermentation; when therefore white bubbles, as mentioned above, are perceived at the bung hole, rack it again, immediately after which it will probably not ferment until March, when it must be racked off as before, and if possible in clear weather.

7. It is of great consequence to prevent the escape of the *carbonic acid*, or fixed air, from cyder, as on this principle all its briskness depends. To effect this, various expedients have been contrived. In the state of Connecticut, where much cyder is made, it is a common practice to pour a tumbler of *olive* oil in the bung-hole of every cask. Upon the same principle we have lately heard of a man, who boasted that he had drank brisk beer out of the same cask for *five* years, and that his secret was to cover the surface of the liquor with olive oil. Dr. Darwin also says he was told by a gentleman who made a considerable quantity of cyder on his estate, that he procured vessels of stronger construction than usual, and that he directed the apple juice, as soon as it had settled, to be bunged up close, and that though he had had one vessel or two occasionally burst by the expansion of the fermenting liquor, yet that this rarely occurred, and that his cyder never failed to be of the most excellent quality, and was sold at a great price.

To prevent a succeeding fermentation, put in a handful of powdered clay, and to preserve it, add

one quart of apple brandy to each barrel: every cask must be filled up, and closely bunged.

8. When care has been taken to prevent the precipitation of the feculent matter which rises in the cyder, good liquor will generally fine without artificial means, but sometimes it is necessary to fine after the last racking, when the above mentioned article has been found to answer very effectually if used in the following way. For a barrel: cut one ounce of isinglass fine, put it into a pint of water, stir it frequently, and make a thick jelly. Dilute this with cyder, strain and mix it well with the liquor in the cask, by means of a long clean stick.

The editor has known an ounce of *orris root*, in powder, give a pleasant flavour to cyder.

A friend directs cyder to be bottled in July, to fill the bottles within two inches of the top, letting them stand twelve hours open before corking.....Use strong porter bottles, and the best velvet corks. The bottling should be done in clear weather.

For the following communication on the making and fining of cyder, the editor is indebted to Joseph Cooper, Esq. of New-Jersey....

"Cyder is an article of domestic manufacture, which is in my opinion, worse managed than any in our country: perhaps the better way to correct errors, is to point out some of the principal ones, and then to recommend better plans.

"Apples are commonly collected when wet, and thrown in a heap, exposed to sun and rain, until a sourness pervades the whole mass, then ground, and for want of a trough or other vessels sufficient to hold a cheese at a time, the pumice is put on the press as fast as ground; and a large cheese is made, which requires so much time to finish and press off, that a fermentation comes on in the cheese before all the juice is out; and certain it is, that a small quantity of the juice pressed out after fermentation comes on, will spoil the product of a whole cheese, if mixed therewith. When either of the above errors will spoil cyder, we need not wonder at the effect of a combination of the whole, as frequently happens. As I have very often exported cyder to the W. Indies, and to Europe, and also sold it to others for the same purpose, without even hearing of any spoiling; and as it is my wish to make the productions of our country as useful as possible, I will give an account of my method of making this valuable liquor.

"I gather the apples when dry, put them on a floor under cover, and have a trough large enough to hold a cheese at once, and when the weather is warm, I grind them late in the evening, spreading the pumice over the trough to air it, as the cyder will thereby be enriched, and a fine amber colour in it produced: and here it may be remarked, that the *longer a cheese lies after being ground, before pressing, the better for the cyder, provided it escapes fermentation* until the pressing is completed. The following experiment will render this evident....Bruise a tart apple on one side, and let it lie until brown; then taste the juice of each part, and it will be found, that the juice of the bruised part is sweet and rich: so if sweet and tart apples are ground together, and put immediately on the press, the liquor which they produce will have the taste of both

kinds of fruit; but if permitted to lie until the pumice become brown, the cyder will be greatly improved.

"I take great care to put cyder in clean sweet casks, and the only way to effect this, is to rinse or scald them well, as soon as the cyder is out, and not to permit them to stand with the lees, which will certainly cause them to become sour, or musty, or to smell. When my casks are filled, I place them in the shade, exposed to the northern air; and when fermentation takes place, I fill them up once or more, to cause as much of the feculent matter as possible, to discharge from the bung; when a clear white froth comes out, I put in the bung loosely, or bore a hole in it, and put in a spile, thereby checking the fermentation gradually. After this has subsided, I take the first opportunity of clear, cool weather, and rack it off into clean casks, which I prepare thus. When I draw cyder out of a cask in which it has fermented, I rinse it with cold water, and put in two or three quarts of fine gravel, and three or four gallons of water; the cask is well shaken or rolled to scour off the sediment always adhering to the cask, and which, if not removed, will act as a ferment to the liquor when returned to the cask, and spoil, or greatly injure the liquor.

After scouring the casks, I again rinse them, and I find advantage from burning a match of sulphur suspended in the cask by a wire, after putting in two or three buckets of cyder. A convenient way to perform this process is to have a long tapering bung, so as that between the two ends it will fit any hole; to the small end of this bung drive in a wire with a hooked end to hold the match. If the cyder stands a week or more after racking, previously to being put away in the cellar, I rack it again, rinsing the casks, but not with gravel, and remove them to the cellar. The late made cyder, I put in the cellar immediately after, or before the first racking, according as the weather may happen to be. The cyder intended to be kept till summer, I rack in cool, clear weather, in the latter end of February, or beginning of March; the casks must be kept full, and bunged as tight as possible."

Mr. Cooper fines with the isinglass jelly mentioned above, but in case the liquor should not fine in ten days, he directs to rack it again, and repeat the fining as before, but says, it is best to rack it, whether fine or not, in ten or twelve days, lest the sediment should rise, which often happens. Mr. Cooper adds, "The foregoing operation should be performed previously to the apples being in bloom, but I have succeeded best in the winter during steady cool weather. I have likewise had good success in fining cyder directly from the press; when this is done, I set the casks with one head out, but covered, put in taps, and let them remain in a cool place properly fixed for drawing; when the fermentation ceases, and the scum begins to crack. I take it off carefully with a skimmer, and draw it from the sediment. If not sufficiently fine before the middle of winter, I fine it again as above.

The settlings of my improved cyder spirit, (see article Brandy) in the proportion of two or three gallons to a hogshead of cyder, answers as well for fining as the isinglass jelly."

The editor will only add one ob-

servation with regard to keeping the pumice some hours before pressing it. In the winter of 1797, he had the pleasure to drink some very fine cyder at his friend Dr. SEAMAN'S, in New-York; and on inquiring into the circumstances of its manufacture, was informed by the Doctor's father, who made it, that he always kept his *pumice* 12 *hours before pressing it.* The practice has since been mentioned to many Pennsylvania farmers, but they did not approve of it. Mr. COOPER, however, explains the propriety of this important improvement in making cyder.

For an account of the best cyder apples, see article FRUIT.]

Cyder is a cooling, pleasant, and wholesome liquor during the heat of summer, if it has been prepared without foreign ingredients, and properly fermented. On the contrary, when it is too new, or tart, or has perhaps been kept in leaden vessels; or the apples and pears have, after grinding them, passed through leaden tubes, we can by no means recommend it as a salubrious beverage; because that poisonous metal is easily dissolved by the acid, and thus gradually introduced into the body. However agreeably such cyder, or perry, may stimulate the palate, it cannot fail, sooner or later, to produce painful and dangerous colics, as it not unfrequently generates the most desperate and incurable obstipations, among those who accustom themselves to the free use of these liquors.

CYDERKIN, PURRE, or PERKIN, is a liquor made of the *murk*, or lees remaining after the cyder is pressed: these are put into a large vat, with half the quantity of cold water, which has been previously boiled: if that proportion be exceeded, the cyderkin will be *small.* The whole is left to digest for 48 hours, when it should be well expressed: the liquor thus obtained is to be immediately barrelled, and closely stopped; it will be fit for use in a few days.

Cyderkin easily clarifies, and is used in many families instead of small beer: if boiled after pressure, with a proper quantity of hops, it may be kept for any length of time.

CYDER-SPIRIT, an ardent liquor drawn from cyder by distillation, in the same manner as brandy is from wine. The flavour peculiar to this spirit is by no means agreeable; but it may, with care, be totally divested of it (see CHARCOAL), and become an excellent substitute for those deleterious preparations, sold under the name of spirituous compounds and cordials. Wholesale-dealers have lately availed themselves of this liquor, and, after imparting to it various flavours, they vend it as a substitute for others, but especially by mixing large quantities of it with foreign brandy, rum, and arrack, without the remotest apprehension of such fraud being detected. [See BRANDY.]

CYDER-WINE is a liquor made by boiling the fresh juice of apples: after being kept three or four years it is said to acquire the flavour and colour of Rhenish wine. The method of preparing it consists in evaporating the juice in a brewing-copper, till one half be dissipated; the remainder is then immediately conveyed to a wooden cooler, whence it is barrelled, with the addition of a due proportion of yeast, and fermented in the usual manner.

This American process has of late years been imitated in the cyder-countries, and particularly in the West of England, where several hundred hogsheads of cyder-wine are annually prepared; and being supposed to contain no particles of copper from the vessels in which it is boiled, the country people consider it as perfectly wholesome, and accordingly drink it without apprehension. In order to ascertain the truth, various experiments were instituted by the late Dr. FOTHERGILL; from the result of which he proved, that cyder-wine *does* contain a minute portion of copper, which, though not very considerable, is sufficient to caution the public against a liquor, that "comes in so very questionable a shape."

Independently, however, of the danger arising from any metallic impregnation, we doubt whether the process of preparing boiled wines be useful, or reconcileable to economy. The evaporation of the apple-juice, by long boiling, not only occasions an unnecessary consumption of fuel, but also volatilizes the most essential particles, without which the liquor cannot undergo a complete fermentation, so that there can be no perfect wine. Hence this liquor is, like all other *boiled* wines, crude, heavy, and flat: it generally causes indigestion, flatulency, and diarrhœa. Those amateurs, however, who are determined to prepare it, ought at least to banish all brass and copper vessels, from this as well as from every other culinary process.

CYPER-GRASS, or *Cyperus*, L. a genus of plants producing seventy-nine species, of which the following are the principal:

1. The *rotundus*, or Round Cyperus, a native of the East-Indies: its imported root is knotty, surrounded with tough, fibrous strings, of a brown colour externally, but grey internally; and of a pleasant odour, especially when fresh and well dried.

2. The *esculentus*, or Eatable Cyperus (earth-almonds), growing wild in the East, in Italy, and the South of France. Its pulpy and mealy root is agreeably sweet, not unlike chesnuts, and might be advantageously cultivated in this country, as an occasional substitute for bread.

3. The *papyrus*, or Paper Cyperus, a native of Calabria, Sicily, Syria, and especially of Egypt, on the banks of the Nile. From this noble plant, the ancients manufactured most of their *paper*, their sail-cloth, mattresses, ropes, nay, even their apparel. Perhaps, we may soon be enabled to import an abundant supply of this valuable vegetable, in British vessels.

4. The *longus*, or Sweet Cyperus, or English Galingale, a native plant, which is chiefly found on the isle of Purbeck, where it flowers in July. Its root is of the size of an olive, full of little knots or specks, of an oblong figure and grey colour; of a warm, somewhat bitter taste; and almost destitute of smell when newly taken out of the ground.

In medicine, the roots of the first, or round cyperus, as well as those of the English galingale, are esteemed cordial, diuretic, and cephalic; they occasionally have afforded relief in nephritic disorders, as also in colics; and may be taken either in powders, or in a decoction. The production of the latter, or native species, however, is at

present seldom used; though we presume it is in no respect inferior to some of the more costly medicines imported into this country.

Cyphel. See Common House-leek.

CYPRESS, the Common, or *Cupressus sempervirens*, L. is a native of the islands of Candia and Crete, but may be easily propagated in Britain, from seeds as well as cuttings. The proper season for sowing the former, is the month of March, when the ground should be dug, well broken, raked smooth, and an inch of the earth drawn evenly off the surface into an alley: the seeds should then be scattered moderately thick, and the soil sifted immediately over them, half an inch deep. During the summer, they should be kept clear of weeds, and, in dry weather, gently watered: in winter, they must be occasionally sheltered from the frost, with mats; and, in the course of two years, they will be fit for transplanting, when they should be set in nursery-rows, two feet asunder; and, in three or four years, they may be removed to the shrubbery.

The cypress-tree, though found in most of our old gardens, is at present much neglected: it deserves, however, to be more diligently cultivated, as it not only adds considerable beauty to wildernesses and groves, but also affords a valuable wood, which is aromatic, very compact, and heavy; is neither liable to decay or putrify, nor to the devastations of the worm, so that it is admirably calculated for chests, drawers, musical instruments, and other utensils.

This tree is eminently recommended for purifying the air, and for the benefit of weak lungs: hence, the ancient physicians sent their consumptive patients to the island of Crete, where the cypress is very abundant. Its nuts, or fruit, is a very powerful astringent and balsamic, and is, perhaps, inferior to none of the simples employed in diarrhœas and dysenteries.

[Deciduous Cypress-tree, or *Cupressus disticha*, stands, according to Mr. Wm. Bartram, in the first order of American trees. It abounds in the southern states, where it measures from eight to twelve feet diameter, and from forty to fifty feet straight shaft.

Shingles are made of the cypress-tree, and sell from 8 to 10 dols. per thousand: they are commonly 2 feet 9 inches long for home consumption, but for the West-India market, those of 18 inches in length are preferred. The cypress is growing in Bartram's garden on the Schuylkill.

Cypress shingles are equally durable as those made of white cedar, but the nature of the wood does not permit them to be cut of a greater breadth than about five and an half inches, and about the length above mentioned. If attempts be made to cut a wider shingle the wood splits.

In driving nails through cypress shingles, they are very apt to split, unless holes are first bored for nails: hence roofs covered with such shingles sometimes leak..... Upon out-houses, they answer as well as the cedar shingles.

For directions to shingle houses in the best manner, see House.]

D.

DAB, or *Pleuronectes limanda*, L. a fish that frequents the English seas, where it is caught in considerable numbers. It is in general of an uniform brown colour on the upper side, though sometimes of a darker shade. The scales are small and rough, and the lower part of the body is white. These fish are in season from February to April: they spawn in May and June, and become watery and flabby during the remainder of the summer. They are flat; and, though inferior in size to the common plaise, the dab is preferred in point of delicacy and flavour.

DACE, or *Leuciscus cyprinus*, L. a fish found in most of the still deep rivers of this country, where it is very prolific. It seldom exceeds 10 inches in length, or weighs more than a pound and a half.

Dace spawn in the month of February, and are in the highest perfection in April and May; but they are at no season a well-tasted fish, or much esteemed. They afford, however, considerable amusement to the expert angler, as they will bite at any fly, but are particularly fond of the stone-caddis, or May-fly, which abounds towards the latter end of April, and the whole of May. After that month, recourse must be had to the ant-fly, the best of which are those black insects found in large ant or mole-hills. In warm weather, these fish seldom refuse a fly on the surface of the water; but, at other times, the bait should be immersed to within three inches of the bottom. The winter angling for dace requires a very different bait: this is a white maggot with a red head, being the produce of the eggs of the beetle, and which is turned up by the plough in great abundance. A number of such grubs, if kept in any vessel with the soil in which they were taken, may be preserved for several months, and will prove an excellent bait....Small dace may be put into a glass or jar with fresh water, which should be frequently changed: in this element, they live a long time, and gradually become tame.

[Dactylis, *glomerata*, American cocks foot, or orchard grass, See Grasses.]

DAFFODIL, the Common, or *Narcissus pseudo-narcissus*, L. an indigenous, perennial plant, growing in woods, meadows, and the sides of hedges, which is found chiefly in the north and west of England. It produces large yellow, ill-scented flowers, which ap-

pear in March....BECHSTEIN observes, that two drams of the root afford a gentle laxative.

DAIRY-HOUSE, in rural economy, a place appropriated to the management of milk, butter, cheese, &c....See MILK, BUTTER, CHEESE, CHURN, and COWS.

A dairy ought to be so situated, that the windows, or lattices, may never front the south, south-east, or south-west; and it should at all times be kept in the neatest order. Lattices are also far preferable to glazed lights, as they admit a free circulation of the air. It has, however, been objected, that the former affords access to the cold air of winter, and to the sun in summer; but either may be easily remedied, by making the frame somewhat larger than the lattice, and constructing it so as to slide backward and forward at pleasure. Across this frame, pack-thread may be stretched, and oiled paper pasted on it, which will thus admit the light, and effectually keep out the sun and wind.

During the summer, dairy-houses cannot be kept too cool: they ought therefore to be erected, if possible, near a cold spring, or running water; and where it is practicable, to conduct a small stream through the premises, it will much contribute to the convenience and utility of the place....Dr. ANDERSON observes, in his practical essay on the management of the dairy (published in the 3d and 4th vols. of his ingenious "*Recreations in Agriculture*," &c.) that if the water can be introduced by means of a pipe, so as to fall from some height on the floor, it will be productive of many advantages, particularly by preserving a continual freshness, and purity of the air.... Dairy-houses should therefore be neatly paved, either with red brick, or smooth hard stone, and laid with a proper descent, so that no water may stagnate. This pavement should be well washed every day during the summer; and all the utensils, here employed, be kept with unremitting attention to cleanliness. Nor should the churns be at any time, scalded in the dairy; as the steam arising from hot water, tends greatly to injure the milk.... For similar reasons, neither the cheese and rennet, nor the cheese-press, must be suffered to taint the atmosphere; as the whey and curd will diffuse their acidity over the whole building.

All the utensils of the dairy should be made of wood, in preference to either lead, copper, or cast iron; for these metals are easily soluble in acids, the solutions of the two first are in a high degree poisonous; and, though the latter is in itself harmless, the taste of it renders the productions of the dairy very disagreeable. The cream-dishes, when perfectly clean and cool, ought to be filled with the milk, as soon as it is drawn from the cow, and has been carefully strained through a cloth, or cloth-sieve made of hair or silver-wire; the latter of which, as Dr. ANDERSON justly remarks, is more wholesome than those of other metals. These dishes should never exceed three inches in depth, but may be so wide as to contain a gallon, or a gallon and a half of milk: when filled, they ought to be placed on shelves, to remain there till the cream be completely separated.... Now it is to be taken off with nicety, by a skimming-dish, (without lifting or removing the milk, or shedding any of it on the floor,

which would soon corrupt the air of the room), and then deposited in a separate vessel, till a proper quantity be collected for churning. A firm, neat wooden barrel, which is open at one end, and has a lid closely fitted to it, appears to be well calculated for this purpose; a cock, or spigot, ought also to be fixed near the bottom, to draw off the thin, or serous part, that may drain from the cream; and the inner side of the opening should be covered with a piece of fine silver wire-gauze, in order to prevent the latter from escaping, while the former is allowed to pass.

But, if notwithstanding the fatal consequences arising from the use of metallic utensils, or of earthen vessels glazed with lead, farmers still persist in employing them, it ought to be a constant and indispensible rule, to scald and scour them properly with salt and water, every day, and to dry them thoroughly, before the milk is deposited in them. Lastly, it is sincerely to be wished, that all the utensils employed in the dairy, of whatever materials they may consist, should be cleaned with similar care, previously to their being used; and, as long as the least acid smell is perceptible, they ought to undergo repeated scourings, till they are completely sweetened....See MILK-HOUSE.

DAISY, the COMMON, or *Bellis perennis*, L. a perennial, indigenous plant, which abounds in meadows and pastures, and is in flower from March to September.

The leaves of the daisy, though slightly acrid, may be eaten as early spring salad, or boiled like spinach; its roots have a pungent taste, and are in high repute abroad as an excellent vulnerary, attenuant, cooling, and astringent medicine: yet no attention is paid to it in this country, except what it claims from the beauty of its flowers; on account of which it has been introduced into gardens....It is refused by horses, sheep, and cows.

M. BECHSTEIN, a respectable German naturalist, mentions a curious fact relative to the virtues of the comon daisy. In the 2d vol. of his *Concise Natural History of Plants, both foreign and indigenous* (printed at Leipzig in 1797) he says in a note...."I am acquainted with a very skilful and experienced physician, who has completely cured several consumptive persons with the *flower buds* of the *bellis perennis*, by stuffing young chickens with these buds, without any other ingredients; then stewing them in unsalted beef-tea or broth, adding a little fresh butter, and allowing the patient for three weeks no other food but the medicated dishes thus prepared. At first, it affords a delicious repast." We candidly confess, we have had no opportunities of ascertaining the efficacy of this preparation, by the test of experience; but nevertheless we believe, that in so desperate a situation as that of *pulmonary consumption*, or other species of *atrophy* (unattended with violent febrile symptoms), it well deserves to be opportunely and fairly tried.

DAMASCUS-Steel. See STEEL.

DAME-WORT, or DAME'S VIOLET, the *Scentless*, or *Hesperis inodora*, L. is an indigenous perennial plant, which grows in pastures and hedges, and flowers in the month of May or June. According to BOERHAAVE, it is antiscorbutic and diaphoretic, and of great service in asthmas, coughs, and convulsions. It has also been re-

commended, externally, in inflammations, cancers, gangrenes, and in contagious disorders.

Damp. See Linen.

DANCING, is the art of moving the body, agreeably to certain rules, and adjusted to the measures of music, either sung or played. It is generally the effect or indication of joy among most nations; though there are tribes in South-America who *dance* to shew their sorrow; and it also formed a part of the funeral solemnities of the ancients.

In the heavy days of autumn and winter, when the atmosphere is loaded with humid particles, when a sedentary life disposes the human body to hypochondriacal affections, *dancing* is an admirable amusement. Independently of the beneficial effects which music and a cheerful company display on a susceptible mind, *moderate* dances possess every advantage of gentle exercise. But those maniacal turnings and gesticulations, which have lately become fashionable in this country, under the appellation of *German Vaults* (or rather *Walzen*, *i. e.* performing a circular motion, like that of a man on the eve of intoxication) are attended with very different effects. It would be superfluous to enumerate the pernicious consequences resulting from that frantic inclination to distort the human frame; we may confidently assert, that *Walzen* is at present almost universally exploded in the cultivated circles of society among the Germans, who consider it as a dangerous and *vulgar* dance. In confirmation of this statement, we meet with a treatise, expressly published, *On the Moral and Physical Consequences of Dancing*; addressed to the guardians of youth, by Dr. Sponitzer (Berlin, 1795); an enlightened physician, whose satire and judgment are equally conspicuous.

Violent dancing, especially in the heated atmosphere of a crowded assembly, produces a temporary fever, even in the bye-standers, who inspire an air exceedingly vitiated by the breath of persons apparently in a semi-delirious trance, and by the suffocating vapour of candles. The blood is unnaturally propelled to the breast and head.... hence arise frequent colds, coughs, and periodical head-achs; perspiration is wantonly checked; the lungs are forcibly expanded, and the foundation is laid for that avenging disease, *consumption*, which spares neither rank, age, nor sex, and often exterminates whole families.

On the other hand, we do not presume to discourage the shorter and less fatiguing dances, such as minuets and poloigneses, which are not only modest and becoming, but contribute to the graceful form and motion of the body. Every provident parent, who feels the value of sound and healthy children, will readily concur with us in opinion, that so precarious a public amusement ought to be regulated by the State, or at least, controlled by the superior sense of the aged; and not to be absolutely intrusted to the choice or caprice of youth, the gay, and the giddy....See Balls.

Dane-wort. See Dwarf Elder.

DANDELION, the Common, or *Leontodon Taraxacum*, L. is an indigenous, perennial plant, growing in meadows and pastures, on road-sides, ditch-banks, &c. It produces yellow flowers, which blow from April to September, and have the remarkable property of ex-

panding early in the morning, and closing in the evening.

In the spring, while the leaves are white, and scarcely unfolded, they are an excellent ingredient in salads. In France, the roots and leaves are eaten with bread and butter. This plant is also relished by goats, and especially by hogs, who devour it eagerly; but sheep and cows dislike it, and horses totally refuse it: the seeds also support the smaller birds, which are extremely fond of them. The root, leaves, and stalk contain a large proportion of bitter milky juice, which possesses considerable activity. Its more immediate operation is to remove visceral obstructions, and promote the urinary discharge. The dose prescribed by BOERHAAVE, for this purpose, is 4 ounces, to be taken three or four times a day; and we can, from experience, corroborate its great efficacy in dropsical, and those complaints which are connected with a disordered state of the first passages; though we have directed it to be taken in much smaller doses. The ancient Greek physicians were better acquainted with the properties of this excellent vegetable, than the modern practitioners, who appear to be more anxious to introduce exotics imported from distant countries, than to ascertain the qualities of those numerous medicinal plants which grow in their own climate. In short, we are induced to believe, that if the Great FREDERIC of Prussia had complied with the excellent prescription of the late Dr. ZIMMERMAN, who directed the extract of dandelion to be taken in moderate portions of two table-spoonsful each time, that extraordinary hero and philosopher would have survived his last attack of dropsy, for many years; because his constitution was unimpaired, and his mind uncommonly vigorous; though he had from his infancy imbibed an invincible prejudice against all physic and its administrators.

DARNEL, or *Lolium*, L. a native genus of plants producing four species, namely:

1. The *perenne*, or Red Darnel, or Ray-grass, which grows on road sides and dry pastures; it attains the height of two feet, and flowers in June. As it makes good hay upon dry, chalky, or sandy soils, it deserves to be cultivated, especially with clover: It springs earlier than the other grasses; thus supplying food for cattle, at a season when it is most difficult to be obtained. But, though it is eagerly eaten when young, it is too dry and hard when converted into hay, by itself. Mr. SWAYNE hints in his "*Gramina Pascua*" (a most valuable publication for practical farmers, who wish to obtain a complete knowledge of the different pasture-grasses;) that the common cultivated *ray-grass* had probably, by frequent sowing, degenerated from its natural qualities, and that it was in many respects inferior to that growing naturally in our best meadows and pastures. Mr. PACEY, an enlightened agriculturist, has lately raised a variety of ray-grass from seeds collected in old pastures, and has now multiplied it to such extent, as to sell annually a considerable quantity at the price of 10*s.* 6*d.* per bushel. It has, by the most competent judges, been proved to be infinitely superior to the cultivated ray-grass, and he has sufficient demand for his

whole produce....The red darnel is eaten by cows, horses, and sheep; but goats do not relish it.

2. The *temulentum*, or Bearded Darnel, a poisonous plant, which grows in ploughed lands among wheat, rye, oats, but chiefly among barley and flax. It flowers in July and August....LINNÆUS observes, that the seeds of this plant, when mixed with bread-corn, produce but little effect, unless the bread be eaten hot; but if malted with barley, the beer becomes more intoxicating, and we may add, the drinking of it is attended with temporary blindness. According to the corresponding account of various authors, the bread made of corn abounding with these seeds, and eaten frequently, produces giddiness, anxiety, vomiting, purging, violent colics, convulsions, palsy, delirium, and death. Hence this plant ought to be carefully extirpated, by weeding, before it runs to seed....Sheep are not fond of it.

3. The *arvense*, or White Darnel, or annual Beardless Darnel, which flowers in July, and is not frequent in fields; it is, however, sometimes very injurious to a wheat crop, but may be easily avoided, by previously separating it from the seed.

4. The *bromoides*, or Drank; wild Oat-grass; or Sea Darnel. It grows on loose sands, near the sea coasts, and flowers in May or June. Both the last mentioned species are not possessed of any peculiar properties.

DATE: See PALM-TREE.

DAY, in general, signifies that space of time during which it continues to be light, in contradistinction to *night*, or the period of darkness, while the sun is illumining the other hemisphere. Hence, the rising and setting of the sun are usually considered as the extent of the day, and the time that elapses from its setting to its rising again, as the night.

In consequence of the unequal length of days, resulting from the peculiar revolution of the planets producing the different seasons, we are inclined to think that many persons, especially in the higher walks of life, avail themselves of this irregularity; insomuch, that by the law of fashion, in winter they convert the night into day; and in summer exchange the most agreeable mornings and forenoons, for damp, unwholesome evenings and nights. It would be a vain attempt to reprobate this unnatural custom, in those circles where it is fancied to be equally vulgar to repair to bed in good time, and to rise early.....a practice instinctively followed even by the lower animals.

To the industrious and *more domestic* members of society, we venture to recommend, while in a good state of health, the following division of the day: namely, in spring and autumn to rise with the first rays of the sun; in summer, one hour after; and in winter, one hour before that luminary appears; to allot every day (Sundays excepted,) from 10 to 12 hours to useful occupations; from 6 to 7 hours to the various purposes of dressing, taking provisions, exercise, or amusements; and also from 6 to 7, or 8 hours, to repose, accordingly as they have been more or less fatigued the preceding day, either by mental or bodily exertions..... Such would be both a natural and judicious *arrangement of the day*; and we make no doubt that those who are disposed to devote their time and labour to the welfare of

the community, will neither have reason to complain that the days are too long, or the nights too short, for useful purposes. See Bed-time.

DEAD-NETTLE, or *Lamium*, L. an indigenous plant consisting of three species, of which the following are the principal:

1. The *allum*, or White Dead-nettle, or White Archangel, which is perennial, grows on rubbish, corn-fields, and ditch-banks, blooms in the month of May or June, and also in September. The flowers of this species have been much celebrated for their efficacy in pulmonary disorders, and in those incident to females; but their virtues appear to be precarious. Early in the spring the young plant is eaten by the country people of Germany and Sweden, among their sanative, culinary, herbs.

2. The *purpureum*, or Red Dead-nettle, Red Archangel, or Dee-nettle which is an annual plant, grows in rubbish, cornfields, and kitchen-gardens, and flowers in the month of May....The leaves of both plants may be boiled and eaten as greens: the latter is relished by sheep, goats, and horses, but refused by cows.

DEAD-TOPS, a disease incident to young trees, which may be cured, by cutting off the dead parts close to the nearest sound twig or shoot, and *claying* them over in the same manner as is practised in Grafting, to which we refer.

DEAFNESS, the state of a person who is deprived of the sense of hearing; it is also used to signify a disease of the ear, which prevents the due perception of sounds.

Deafness is frequently the effect of old age, and is incident to most persons in the decline of life. It is, however, sometimes owing to an original defect in the organic structure of the ear; in which case the unhappy individual not only continues deaf, but frequently also speechless. See Dumb.

This complaint may indeed arise from a variety of causes: such as injuries sustained by the ear from wounds, ulcers, excessive noise, violent colds in the head; fevers, hard wax adhering to the cavity of the ear; or, too great a degree of either moisture or dryness in that organ. When it is the effect of old age, or of wounds and ulcers in the ears, it is not easily remedied. If it proceed from a catarrh affecting the head, especially after cold-bathing, the patient must be careful to preserve that part constantly warm, particularly during the night: he should likewise take some gentle laxatives, keep his feet warm, and bathe them frequently in tepid or luke-warm water, at bed-time. Mercurial frictions have, in this case, been applied with success. But, if the complaint originate from fevers, it will generally disappear when the patient recovers his health; or if it arise from dry wax clogging the ears, this may be softened, by dropping a little sweet oil, or oil of rosemary, into them; after which they sould be syringed with warm milk and water.

If deafness be occasioned by too great a dryness in the ears (which may be easily ascertained by inspecting them,) half an ounce of the oil of sweet almonds, and the same quantity of camphorated spirit of wine, or tincture of asafœtida, may be mixed together, and a few drops poured into the ear every night, previously to going to bed; care being taken to close them af-

terwards with a little wool, or cotton. When the ears abound with moisture, the superfluous humour may be drained by an issue, or seton, which should be made as near as possible to the part affected.

Various other remedies have been employed for the cure of deafness; such as the gall of an eel mixed with spirit of wine; or equal parts of Hungary water, and spirit of lavender, to be dropped into the ear. ETMULLER highly extols amber and musk; and BROOKS affirms, that hardness of hearing has often been cured by putting a grain or two of musk into the ear with cotton wool. Where, however, a powerful stimulant becomes absolutely necessary, camphorated oil, with the addition of a few drops of volatile alkaline spirit, may be considered as one of the most powerful applications. It will be proper, in such case, to begin with a very small quantity of the alkali, and to increase it progressively, as the ear is enabled to bear it. In several instances, where the disease depended on a state of insensibility in the nerves, both the shower-bath and electricity have been successfully resorted to....We can from experience recommend a few drops of onion juice on cotton, to be worn in the ear for several weeks, and daily renewed. Dr. SIMS judiciously advises deaf persons to expire forcibly, with their mouth and nose closely stopped; a simple but rational expedient, which ought to be frequently repeated, though it has sometimes afforded instant relief.

These various remedies, however, should be judiciously adapted to different states of the disorder; for, though real benefit has occasionally been derived from them, yet they also often fail, and, not unfrequently, are productive of injury. The organs of hearing, as well as those of sight, being extremely tender, require the most cautious treatment, and ought not on any account to be tampered with, nor submitted to the experiments of ignorant pretenders. Hence, instead of having recourse to *nostrums*, we recommend those persons, who are afflicted with deafness, *to keep the head warm*.... From whatever cause the disorder may originate, this will always be found the safest and most proper practice;....more real benefit has often been derived from it, in the most obstinate cases, than from any medicines whatever.

[A case of deafness that ensued from plunging suddenly into water, was cured by a salivation. *Medical Commentaries*......This complaint frequently proceeds from hardened wax in the ears; the remedy in this case, is, to syringe the ears repeatedly with warm milk and water. When it proceeds from a violent cold, bleeding with leeches, and blistering behind the ears are highly useful. When the complaint arises clearly from too great relaxation of the tympanum or drum of the ear, the fine powder of cantharides (Spanish flies) has been directed to be blown into the ear to stimulate the parts; but as some difficulty must occur in regulating the proper quantity; we suggest the propriety of conveying the vapour of æther into the ear, in preference.]

DEAL, a well known wood, being the production of the fir-tree, and of great utility for building, and other purposes.

An excellent method of seasoning planks of deal and fir is, to im-

merse them into salt-water, as soon as they are sawed, for three or four days; care being taken to turn them frequently during that time. They should then be exposed to the sun and air, which will, in a considerable degree, harden them, though it will not prevent them from shrinking. See TIMBER. FIR-TREE.

DEATH, a term more easily understood, than defined. Although it may generally be said, that death consists in the separation of the soul from the body, yet this explanation is so far imperfect, as we possess but a distant idea of the connexion subsisting between the mind and the animal frame: nor does the definition here stated express any more than the effect, but leaves us completely ignorant of the cause of that great event, or the physical process by which dissolution is accomplished.

In order to prepare the reader for more clearly understanding the symptoms of actual dissolution, we shall briefly relate the gradual decay preceding this catastrophe.

The human body is, from its birth, liable to continual changes, in consequence of the different vital, animal, and other functions, it performs, till it attains a certain age, let us suppose that of *thirty-five* years, in a state of perfect health, these changes tend to improve its solidity, strength, and sprightliness, without detracting from its organic vigour. After that period, which we may venture to call the *meridian* of life, it gradually declines. The smallest fibres become rigid; the minute capillary vessels corrugate, admit no fluids to pass through them, and at length change into fibres; the larger blood-vessels grow hard and narrow; in short, all the outlets of the body become contracted, and in a manner close; whence the dry, shrivelled, and inflexible state of old age. Thus, the interior organs every day become more inert in performing their functions; the humours stagnate, thicken, and at length are partly converted into solids: hence the skull and other bones are much thicker in the aged than in other adults. Digestion is weakened; assimilation is prevented; and all the animal functions are gradually impaired: the skin, that wonderful contrivance in the animal economy, ceases to perform the important offices of absorption and perspiration.....the myriads of pores are closed....the blood-vessels no longer impel the vital fluid, and are become inert as the time-piece, the spring of which has been neglected by the artist. At length, reduced to a state bordering on vegetable life, in the same ratio as plants are linked to minerals, the connection that hitherto subsisted between our mental and physical nature, is totally dissolved; or, in other words, *death* is the necessary consequence.

Few persons, however, arrive at the stage of life we have just described: by far the greater proportions of human beings die in their infancy, or are cut off in the bloom of life, by a long and horrid train of diseases. Besides, there are numberless accidents to which we are daily liable; nay, all the elements which surround us, may prove, according to the use we make of them, either salutary or fatal....In this place, therefore, we shall give a concise view of the most unerring signs of death, if taken collectively; and explain the treatment to be adopted in the dif-

ferent casualties, such as DROWNING, &c. in the order of the alphabet.

SYMPTOMS OF DEATH: 1. Cessation of the pulse; 2. Total suppression of breathing; 3. Loss of animal heat; 4. Rigidity of the body, and inflexibility of the limbs; 5. Relaxation of the lower jaw; 6. Inability of the eye-balls to return to their sockets, when pressed by the finger; 7. Dimness, faintness, and sinking of the *cornea*, or the uppermost horny coat of the eye; 8. Foam in the cavity of the mouth; 9. Blue spots of various sizes, and on different parts of the body; 10. A cadaverous smell; and, 11. Insensibility to all external stimulants.

All these symptoms, however, if individually considered, are far from being conclusive: they then only afford a certain criterion of death, when most or all those appearances concur at the same time, especially if the 6th, 7th, and 10th of the signs be strongly marked.

One of the most infallible methods of distinguishing *apparent* from *real* death, is that lately suggested by Professor CREVE, of which we shall give a short account, under the head of GALVANISM.

APPARENT DEATH, is that state in which life is suspended, either because the body is not susceptible of external stimuli, or the interior organs are in a state similar to that of palsy.

Dr. STRUVE, in his *Practical Essay on the Art of recovering Suspended Animation*," lately translated from the German (12mo. London, 1801, 3*s*. 6*d*.), exhibits the following view of all the

Symptoms of Life: A slight degree of warmth in the region of the heart, accompanied with contractions and dilatations; a vibrating motion of the whole body, especially after being sprinkled with cold water; and a convulsive tension of some muscles.

Doubtful Signs: Rigidity of the limbs, gradual smoothness of the skin, warmth and redness in particular parts of the body, hiccough, contraction and hissing of the nostrils, a tremulous motion of the whole body, mucus issuing from the nose during the artificial inflation of the lungs, a slight convulsive motion of the mouth, and a firm compression of the teeth.

More certain signs: Gentle throbbing of the heart; pulsation of the temporal arteries; a slight convulsive motion of the inner corner of the eye; vibration of the eye-ball; and almost imperceptible convulsions of the muscles surrounding the neck.

Distinct signs of Life: A gentle motion of the jaw; gradual redness of the lips and cheeks; contraction of the different muscles in the face; convulsive motions of the toes; sneezing; tremor of the whole body; vomiting; respiration interrupted by coughing, and groaning.

DEATH-WATCH, or *Termes pulsatorium*, L. a small insect that harbours chiefly in old wood. It is produced from a very minute white egg, which is hatched in the month of March.

When these vermin first leave their shells, they are scarcely perceptible, without the aid of a microscope: from this diminutive size, they gradually acquire their perfect state, when they are about 5-16ths of an inch in length, and of a dark brown, spotted colour....

They are remarkable for the ticking noise, similar to that of a watch, which is made by the male and female, when wooing each other. This expression of mutual affection was formerly considered, by the superstitious, as a presage of death in the family where it was heard; from which circumstance the insect has received its name.

DEBILITY, is that feeble state of life in which the vital functions are languidly performed; when the mind loses its cheerfulness and vivacity; when the limbs are tottering with weakness, and the digestive faculty is impaired.

This complaint, which at present is so prevalent, even in the bloom of life, and among those who ought to form the most vigorous and robust part of a nation, may arise from a great variety of causes, of which the following are the principal: 1. Descent from enfeebled parents; 2. Changes in the admixture, and component parts of the surrounding atmosphere; 3. A sedentary and indolent mode of life; 4. Immoderate sleep; or, in a still more hurtful degree, want of the necessary portion of sleep and repose; 5. Too great exertions either of mind or body; 6. The *unnecessary* and *imprudent* use of medicines; lastly, the almost total disuse, and exclusion of gymnastic exercise, and the general introduction of *sedentary games*, the effect of which creates an almost universal apathy to every pursuit that requires exertion.

Debility is the source of numerous disorders, such as spasms, palsy, violent evacuations, hemorrhages, putrid and nervous fevers, fainting fits, and apparent death.

The means employed for the preserving and maintaining *feeble life* (says Dr. STRUVE, in his *Asthenology*; or, the Art of preserving Feeble Life, 8vo. 8s. 1801), are as various as the causes on which it depends, and the disorders with which it is generally accompanied. The first object that claims the attention of persons in this state, is *warmth;* the external application of which ought to be proportioned to the temperature of the body, and gradually augmented, accordingly as the natural warmth of the individual increases. If duly applied, gentle heat possesses both stimulating and strengthening properties, by which the activity of the vital principle is excited and supported. The communication of warmth may be considerably facilitated by the use of the *tepid* or warm bath, of which we have already spoken. See BATH.

The next, and one of the most important objects to debilitated persons, is *diet;* in which respect much depends on their previous habits and modes of life. If they carefully attend to the peculiarities of their constitution, and observe whatever is to them salutary or hurtful, they may prolong their lives for a considerable time; provided their conduct be guided by the necessary knowledge and experience. In short, to guard against excess, and pursue a middle course, will be the best means of accomplishing the most salutary end.

Debilitated persons ought to be imperceptibly hardened; the transition to a severer and more invigorating course of life must be so progressive, that the convalescent be not subjected to any disagreeable restraint; and this method

should likewise be continued for a sufficient length of time, during which he ought never to return to his former debilitating habits.

Such invalids should eat only a very small proportion of animal food, namely, white meat, which is least stimulating, together with a due quantity of the most nutritious vegetables. They may also partake of small portions of flesh-broth, thickened with sufficient bread, rice, &c. to render it more nourishing and less flatulent; but they ought to abstain from fat, and milk, unless the latter be given immediately after it is drawn from the cow.

If solid food cannot be allowed, or if it irritate the stomach, recourse must be had to gelatinous aliment, such as eggs, nourishing soups, salop, barley broth, shell-fish, &c. which, if taken in small quantities, are exceedingly strengthening.... Persons of this description ought to accommodate their whole dress to the climate, and changes of the weather; they should at all times endeavour to procure a middle temperature between cold and heat; for instance, from 60 to 65° of FAHRENHEIT's scale. Woollen clothing is, in this respect, far preferable to fur; as the latter heats the body, and increases perspiration. Flannel, if worn next the skin, will preserve the human frame in a more equal temperature than is attainable by any other substance; and at the same time protect it from the hurtful influence of the two extremes.

Individuals, in this state, require longer and less disturbed rest than those in perfect health and vigour. Labour and exercise, adapted to their habits and strength, will greatly promote that desirable object; likewise the tepid bath; a clean, and not too soft couch; an airy, healthy, and capacious apartment; but particularly a calm and composed mind; which last possesses a most powerful influence in preserving health and life; for, without tranquillity, all other means will be ineffectual. For a more particular account of the causes, symptoms, and cure of debility, we must refer to Dr. STRUVE's elaborate work, before mentioned, in which this subject is minutely discussed.

DECANTER: See BOTTLE.

DECIPHERING, or DECYPHERING, the art, or act of discovering the alphabet of a cypher, or of explaining a letter written in cyphers, or secret characters.

Every language has peculiar rules of deciphering, which depend not only on the form of its characters, but also on the place, order, frequency, combination, and number of the letters. The importance of this science to politicians has long been acknowledged, and several ingenious philosophers of the 17th century, published profound treatises on this subject; but, as it would be deviating too widely from the avowed plan of this work, to enter into the theory of deciphering, we can only refer the curious, who desire farther information on this head, to the 12th volume of the *Gentleman's Magazine* for 1742, where they will find the art of deciphering deduced from principles, and explained by examples in several languages. It deserves to be remarked, that there is extant, in the library of Oxford, a collection of letters written in cypher, about the time of CHARLES the Second, and decyphered by Dr. WALLIS, the most eminent scholar this coun-

try ever produced, in that branch of mystical grammar. Mr. W. WALLIS, a descendant of that learned divine (whose "Life and Sermons" he has lately published), is in the possession of another volume of *Decyphered Letters*, with their keys in various cyphers and characters; the whole of which contains much information relative to the transactions of those times; as the Doctor held the appointment of decypherer to that suspicious king.

DEED, an instrument written on paper or parchment, which relates principally to the conveyance, or transferring of property, and the validity of which consists in the following essential particulars: 1. Proper parties to contract with one another, and a proper subject matter to be contracted for; 2. A good and sufficient consideration; 3. Writing on parchment, or paper, duly stamped; 4. Sufficient and legal words, properly disposed; 5. Reading (if it be desired) before execution; 6. By stat. 29 CAR. II. c. 3. in many cases signing also; and, lastly, delivery, which must be done either by the party himself, or by his attorney, lawfully authorised, and expressed in the attestation. If any of these requisites be wanting, the deed is absolutely void, from the beginning.

The preservation of deeds is an object that has ever engaged the attention of the lawyer and the antiquary: it is of still greater importance to those who hold estates or other tenements, in order to enable them to peruse such papers as have been kept for a series of years, and which, from moisture, or other causes, are almost illegible. To facilitate this desirable object, we select the following, as being the most simple of the many recipes which have been recommended: Immerse the parchment obliterated by time, into a vessel of cold water, fresh drawn from a well: in the space of a minute, it should be taken out, and pressed between two blotting papers, to prevent it from shrivelling, while it is drying. As soon as it is moderately dry (if the characters be not legible), the operation should be repeated two or three times. Thus, the skin will resume its pristine colour, and appear throughout alike.

DEER, the *Fallow*, Buck and Doe, or *Cervus Dama*, L. a well-known animal abounding in the forests and parks of this country.

Deer are of various colours; being reddish, deep brown, white, or spotted: they are easily tamed; and their flesh, which is called *venison*, is in high esteem among epicures. It is an excellent aliment; but, to the very great detriment of health, venison is seldom eaten till it is half putrified, or (as connoisseurs in this important article express themselves) till it has a *proper fumet;* though the flesh of this animal is naturally inclined to putrescency. When properly dressed, it affords a mellow food, and is easily assimilated to the human fluids: it ought always to be roasted or stewed, as it is otherwise apt to become dry and fibrous, from the constant motion of the deer, while alive. Hence such food is of a heating nature; and persons who are pre-disposed to the scurvy, or to other cutaneous diseases, ought to abstain from it, especially during the summer.

Deer-skins have been long celebrated for their softness and pliability; and the manufacturing of

them into breeches and gloves, affords subsistence to a very numerous and industrious class of people.

Beside their utility, as an article of food and clothing, several parts of the deer were, in superstitious times, often employed in medicine. Their *blood*, if drunk immediately from the vein, (according to Doctor James, the inventor of the fever-powders), completely relieves *giddiness in the head:* their gall is said to be detergent, to cure dimness of sight, and to remove films from the eyes; the liver is recommended against diarrhœas; and their horns and suet are applied to the same purposes as those of the Stag, to which we refer.

DEFORMITY generally signifies the want of that symmetry, and uniformity, which are necessary to constitute the beauty of an object; it is more particularly applied to the human frame.

The chief cause of the personal deformity so frequent at present, is the neglect of paying proper attention to the clothing of infants, by which they are deprived of the free use of their limbs; and thus, in a great measure, rendered unserviceable to society. But, though deformity may apparently be prejudicial to health, it is ultimately a real advantage. Deformed persons, it is true, possess a less share of strength than others; they should therefore be naturally more careful to preserve it, as well as their health; which can be effected only by a strict adherence to temperance. This object will likewise be considerably facilitated by moderate exercise, which few, in such a situation, can want strength to perform; and, as they are not calculated for violent exercise, they are consequently exempt from all the disorders arising from that source; and may thus attain a mature old age. For a further investigation of this subject, we refer the reader to an ingenious essay, intitled "*Deformity*," by Mr. Hay, in 8vo. published in the year 1753, and of which a new edition appeared a few years since, collectively with his other works, in 2 volumes, 4to. where it is amply discussed.

DEW is a light, thin, and transparent vapour, slowly exhaling and ascending from the earth, in spring and summer mornings, while the sun is below the horizon, and then deposited on vegetables, in the form of small globules.

Naturalists rank *dew*, in general, among the numbers of watery meteors; some, however, term it a liquefied vapour, precipitated in drops; others, a vapour having a similar relation to frost, as rain has to snow, &c....It is admited, that dew cannot fall before it rises; and that its origin and matter, no doubt, is from the vapours and exhalations of the earth and water, as will be briefly stated under the article Evaporation.

That dews are more copious in spring than in any other season, arises from the greater stock of vapour collected on the surface of the earth, and the previous small dissipation of it during the cold and frost of the winter. Hence the truth of Pliny's remark is evident, that *Egypt* abounds in dews throughout the hot part of summer; for, as the air during the day is too hot to condense the vapours, they never form clouds, and consequently produce no rain: thus, in climates where the days are excessively hot, and the nights remarkably cold, the vapours, rising

before or after sunset, are readily converted into dew....In the more temperate climates, they ascend and fall in greater abundance after rain than after dry weather. There are some places in which dew is observed only to rise, but never to fall; and again others, in which it is carried upward in a more considerable proportion than downward, on account of the prevalence of winds by which it is dispersed.

Many whimsical properties and effects have, by the chemist, been attributed to common *dew;* but we conceive that, in its physical nature, it differs very little from *rain;* except, however, that the former is more subtle or penetrating than the latter. Hence it will be found that the leather of shoes and boots is more thoroughly soaked by walking one hour in a dewy meadow, than by exposing them double that length of time to rain-water....See Leather.

It is farther remarkable, that plants continually exhale dew through the orifices of their vessels, and that this moisture is not a vapour collected by their leaves, as has often been erroneously believed. Each plant exhales this dew, according to the peculiar structure of its organs, and the situation of their orifices. Even shut up in vessels, and covered under glasses, plants have collected a greater quantity of dew during the night, than those standing in the open air. Of this nature, likewise, is the oily or honey-dew, which is sometimes exhaled by trees, as well as herbs, during the summer, and which has been found to settle on the oak, ash, &c.

May-dew, is that which falls in the beginning of summer, but especially in the month of May. It is of a yellowish colour, and many virtues are attributed to this liquid. It is principally used for whitening linen and wax; which, if exposed to it, will gradually acquire a beautiful white.

DEW-BORN, in animal economy, a distemper to which cattle are subject: it is a swelling, or distension of the body, to such a degree, that the creatures affected are in danger of bursting. This malady is occasioned by turning them into rank pasture, or feeding them with watery grasses. When they are thus distended, they ought first to be driven, or moved about briskly, and then properly purged. Should this treatment not relieve them, blood-letting in the tail will be necessary; after which, the top of an egg should be broken off, and a sufficient quantity of white poured out to admit the powder of a nutmeg. These ingredients are to be well mixed, and the whole, together with the shell, forced down the throat of the animal, which should then be gently walked about; and thus it will speedily recover.

[DIABETES, a distressing disease, and very difficult of cure.... The chief symptom, is a discharge of a very great quantity of limpid sweet urine. The thirst is great, skin parched, tongue white, and moist on its exterior surface, but reddish on the external edges, saliva white, and viscid.

This disease is sometimes attended with fever of the inflammatory kind, in which case the usual remedies will be proper, as small bleedings, and low diet. But in general, it proceeds from a diseased state of the stomach, and of the natural powers of digestion and assimilation. The cure is perform-

ed by a regimen, and medicines preventing the formation of sugar, and diminishing the increased action of the stomach. Confinement and entire abstinence, from any species of vegetable matter, a diet solely of animal food, with emetics, *hepatised ammonia*, narcotics, and occasionally the use of sulphur and castor oil, when requisite, comprehend the principal means employed by Dr. ROLLO, the latest writer on the disease.

Dr. RICHTER says, he cured an alarming case, by emetics. Astringents, as *alum*, and sugar of lead, (2 gr. three times a day) have been used with success in some cases proceeding from general debility.]

DIABETES, in farriery, denotes a profuse *staling* of horses: it is generally occasioned by too violent exercise, or by over-straining, &c. When this malady attacks old horses, or those of a weak constitution, it is seldom curable; because they rapidly lose their flesh and appetite, grow feeble, exhibit a staring coat, and ultimately perish. On the contrary, young horses, subject to this disease, may mostly be cured by frequent blood-letting, in small quantities; and the following decoction has often been administered with success. Take of Peruvian bark, 4 oz.; Bistort and Tormentil-root, of each 2 oz.; boil these ingredients in two gallons of lime-water, till one half be evaporated: a pint of this liquor should be given three times a day; care being taken not to indulge the horse, either with too much water, or moist food.

[This disease in horses may easily be distinguished from others of the kidneys, by attention to the following symptoms; the surface of the body is cold; the coat rough; loss of appetite; a constant thirst; the animal often craving for water; a frequent and copious discharge from the bladder, which is not truly urinous, but of a pale colour, and an insipid, or sweetish taste; the pulse is weak and quick, attended with a gradual wasting of the flesh. If the disease be of a long standing, it is very difficult to cure. Warm mashes and clothing will be found of great service; to which may be joined the following course of medicine:

Take Peruvian bark in fine powder, 12 oz.; gentian in powder, 3 oz.; honey sufficient to form 16 balls.

One of these balls may be given every morning; and if required, the whole may be repeated. The horse should be gently exercised every day....RYDING.]

DIAMOND, a genus of siliceous earths, and the hardest of all the stones hitherto discovered; it is in general transparent, but is sometimes found of a rose-colour, or inclined to green, blue, yellow, or black.

The most valuable diamonds are those of a complexion similar to that of a drop of water: their price also increases in proportion to the regularity of their form, and accordingly as they are free from spots, stains, flaws, specks, and cross veins. Diamonds are found chiefly in India and South America, whence they are brought to Europe in a rough state, in the form of roundish pebbles with shining surfaces. There is, however, a kind of diamonds, which are but little esteemed, found in various parts of Europe, and also in this country, in the county of Cornwall, where they are called *Cornish diamonds*. These

may, with more propriety, be termed crystals; they are found in digging the tin-mines of Cornwall, and are, in general, bright and clear, except towards the root, where they are coarse, and assume a whitish colour.

It is remarkable that *genuine* diamonds, when exposed to the rays of the sun, attract light, which they again emit, and appear luminous in the dark. The largest jewel of this description, in the world, is at present in the royal treasury of Portugal: it is of an oval figure, measures about 4 inches by 3, weighs 1680 carats, or 12½ ounces, and is valued at 224 millions sterling.

Independently of the purposes to which the diamond is subservient as an ornament, especially in the dress of females, the smaller particles of it have, since the 16th century, been employed for cutting glass; and when reduced to an impalpable powder, are very useful for polishing other precious stones, as well as for engraving on those which possess an inferior degree of hardness.

For the valuation of diamonds of all weights, Mr. D. Jefferies, an ingenious jeweller, who published a treatise on diamonds and pearls, several years since, lays down the following rule: He first supposes the value of a rough diamond to be settled at 2*l.* per carat, at a medium; then, to find the value of diamonds of greater weight, he directs to multiply the square of their weight by 2, and the product is the value required. On this principle, Mr. Jefferies has constructed tables of the price of diamonds from 1 to 1000 carats, which the curious reader will find in the work before mentioned, of which a new edition appeared a few years since, in 8vo. price 12*s.*

DIARRHOEA, or Looseness, is a frequent and copious evacuation of liquid excrement by stool.

This malady is very common, being either a primary disease, or only a symptom or effect of another. In many cases it is a salutary effort of nature, and therefore should never be stopped, unless it continue too long, or evidently weaken the patient. Infants, adults of tender and delicate constitutions, and those who are of a choleric, or a sanguine habit, are peculiarly liable to this disorder, which may be occasioned by too great a quantity of aliment being taken into the stomach; by the acrid or flatulent nature of the food; by an impaired state of digestion; by various passions of the mind; by diseases of other parts, or of the general system.... Many other causes might be enumerated, but these will be sufficient to shew the propriety of not attempting to adopt, in this instance, an *uniform* mode of treatment.

Where looseness is occasioned by excess, or repletion, or from improper food, a gentle emetic may be safely administered, as it will not only cleanse the stomach, but promote all the secretions. The patient ought then chiefly to live on light vegetable dishes, and to drink whey, thin gruel, or barley-water. If a diarrhœa be the consequence of violent passions, or affections of the mind, it requires to be treated with the utmost caution. Very mild laxatives, sometimes gentle opiates, and other antispasmodics, are in such cases the most proper; particular care ought to be taken, to restore cheerfulness,

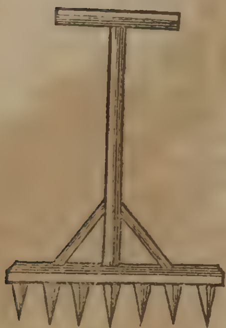
and tranquillity of mind; as, without this, medicines will be of little or no service.

Those persons, who, from peculiar weakness, or too great an irritability of the bowels, are liable to periodical or frequent returns of this disease, ought to live with a constant regard to temperance, and avoid all crude summer fruit, and provision of difficult digestion..... They should, likewise, strictly guard against cold, moisture, or whatever may tend to obstruct perspiration; wear flannel next their skin; and carefully avoid every inducement to the depressing passions of fear, anger, &c. Nutritive drinks, such as broths, gruel, &c. with an addition of rice, or toasted bread, may be taken freely; but, beyond these, the patient should not venture without medical aid, unless he be able clearly to ascertain the cause on which his complaint depends....See BILE.

DIBBLE, or DIBBER, a simple but useful implement in gardening, for the purpose of setting out young plants, &c. Within these few years, it has been employed for *dibbling wheat*, and the whole process consists in making perpendicular holes an inch and a half or two inches deep, in the same manner as is usually done in planting potatoe-roots. These holes are made by a man who has a proper staff, shod with iron, in each hand; and, as he walks backwards, is able, by looking at the part of the row already formed, to keep nearly in a strait line, and to make two holes at once, about four inches distant from set to set in the rows. Two or more children attend him, and drop, two, three, or four seeds into every hole, which are afterwards covered by drawing over them what is called a *bush-harrow*.

This method is deservedly considered one of the greatest improvements in agriculture. It appears to have originated from the planting of grain in a garden, from mere curiosity, by persons who neither designed, nor had any opportunity of extending it to a lucrative purpose. Nor was it attempted on a larger scale, till an industrious farmer, in the vicinity of Norwich, began to dibble on less than an acre of land. The success of this experiment induced others to follow this example, and notwithstanding the ridicule they incurred for adopting so singular a practice, their crops were not only larger, but likewise so much superior to those of others, that *dibbling* has become the practice of every intelligent agriculturist in Norfolk, whence it has spread into several other counties.

From a conclusive experiment made by the Rev. H. J. CLOSE, of Trimley, near Ipswich, in the years 1783-4, it appears, that drilling, or dibbling, greatly exceeds the broad-cast husbandry, on the best cultivated soils; and, besides the increased produce of grain, many other advantages arise from the former method. For instance, it employs a greater number of labourers, especially women and children that cannot be serviceable in the common mode of culture. Mr. CLOSE employed the following frame for setting wheat:



This implement is two feet two inches wide, and provided with seven tines; but Mr. C. has since experienced that a frame of similar width, with *five* tines only, is preferable to one of *seven*.

The lands on which this method may be practised with the greatest advantage, are either those after a clover stubble, or where trefoil and grass-seed were sown in the spring before the last. These, after the usual manuring, are once turned over by the plough in an extended flag or turf, at ten inches wide, and the wheat is set in the manner already described. By this mode, three pecks of grain are sufficient for an acre; which, being immediately buried, is equally secured against the depredations of vermin, or the power of frost. The regular manner in which it rises, affords the best opportunity of keeping it clear from noxious plants, by weeding or hand-hoeing.

Dibbling is peculiarly beneficial when corn is dear; and, if the season be favourable, may be practised with great benefit, both to the public and the farmer: as it saves six pecks of seed-wheat per acre; and, if generally adopted, would of itself afford bread for more than half a million of people. It should, however, be observed, that in seasons when corn is sold at a low price, or the autumn unfavorable to the practice, it cannot be practised with advantage. Thus, in light lands, a very dry season prevents dibbling, because the holes will be filled up as soon as the instrument is withdrawn. In like manner, on strong and stiff clays, if it be very wet, the seeds in the holes cannot be properly covered by the bush-harrow. These two extremes, however, seldom happen; nor do they affect lands of a moderately consistent texture, or both light and heavy soils at the same time; so that they never preclude the general adoption of this useful and rational mode of saving seed-corn.

DIET, in animal economy, a regimen or course of living, adapted both for the preservation of health, and its recovery, especially from chronical diseases.

The dietetic treatment ought to be conformable to the different constitutions of individuals. Those whose solids are relaxed and weak, should avoid all tough or viscid food, and such as is difficult to be digested. Their nutriment, however, ought to be substantial; and they should take frequent exercise in the open air. The plethoric, or those who abound with blood, cannot more effectually consult their health, than by a sparing use of whatever is in a high degree nourishing, as fat-meat, rich wines, strong ale, &c. Their aliment should consist chiefly of bread, or other vegetables, and their drink of water, whey, or small beer.... See Corpulency.

Persons of a lean habit ought to follow a course directly opposite to

that before suggested. Those who are troubled with acidity, should live chiefly on solid meat; and those afflicted with hot alkaline eructations, should principally use acid vegetables. Invalids subject to the gout, to low spirits, to hypochondriac, or hysteric disorders, should avoid all flatulent food, as also all salted, or smoke-dried provisions, and whatever is difficult of digestion, or apt to turn sour and rancid on the stomach. Their food should be light, spare, cool, and of an opening nature.

Another important object to be considered, is the manner of life and age, together with the season and constitution. Those whose inclination, business, or profession lead them to a sedentary life, ought to be more sparing as to the *quantity*, and more attentive to the *quality* of their aliment, than others whose pursuits are widely different, or who are accustomed to take much exercise: the former ought particularly to avoid the use of every thing that is sour, flatulent, rancid, and oppressive to the digestive organs.

Persons liable to particular diseases, should be cautious in eating whatever tends to aggravate them. The gouty, for instance, should avoid drinking rich wines, strong soups, or acids. Those who are subject to the gravel, ought to shun all austere and astringent aliments: nor should the scorbutic indulge in animal food.

The aliment in early life ought to be light, nourishing, and taken frequently, but in moderation: that of adults should be solid, and sufficiently tenacious; the diet proper for those advanced in life, should resemble that of infancy.... At every period of life, gluttony ought to be sedulously avoided; for, not unlike too great abstinence, it destroys the powers of digestion; but the moderate repetition of aliment is necessary for restoring the continual waste of the body.

Diet ought also to be regulated according to the different seasons of the year; because variations in the atmosphere produce corresponding changes in animal bodies. In consequence of the increased elasticity of the air, in the winter, the fibres are stronger, and better qualified for performing their various functions, and for digesting the stronger kinds of food. If there be no paticular reason for the contrary, generous wines, and wholesome ale, together with warm broths and infusions, may be then taken, to promote the insensible perspiration, which is in some degree checked; as the cold air remarkably contracts the cutaneous pores. Some attention should also be paid to this circumstance, that the perspiration bear a due proportion to the liquid and solid nutriment consumed.

In the spring, the quantity of food ought to be somewhat diminished, and an additional allowance of the liquor usually drunk, might be granted. In autumn, similar regulations are to be observed, as in the spring; because the moisture and density of the air are nearly the same, and the weather is equally variable; so that perspiration is easily obstructed. During the summer, health may be most effectually preserved by vegetables, and diluent liquors. Considerable care should be taken to abstain from provisions that are heavy and difficult to be digested, but especially from wine and brandy.

The feeble and convalescent

ought to eat frequently, and but little at a time: the number of meals should be proportioned to the weakness of their frame:....for it is far less hurtful to a debilitated person, to eat a few mouthfuls every hour, than to make two or three *hearty* meals in one day: an exception, however, ought to be made with respect to those who are naturally of a delicate and irritable constitution.....See FOOD and DRINK.

FAMILY-DIET. After the various and successful experiments made by Count RUMFORD, and others, who have written on domestic economy, little novelty can be expected in this article; but as the present work might be considered as incomplete, without some information on this important subject, we have selected a few practical hints which appear to merit particular attention.

Dr. LETTSOM has observed...... (" *Hints designed to promote Beneficence, Temperance, and Medical Science*," 8vo. 1797), that *pies* are more advantageous than either roasted or boiled meat. This he illustrates by an account of a dinner, where *eight* persons were completely dined off a pye, consisting of 24oz. of wheaten flour, 64 of mutton, and eaten with 8½ oz. of bread; weighing in the whole 96½ oz. while 60 oz. of mutton *roasted*, and eaten with 33 oz. of bread, weighing in the whole 93 ounces, dined only *five* of the same persons.

Milk pottage is far more wholesome than tea with bread and butter; and, if made after the following manner, is in many respects preferable to milk alone: Let equal quantities of milk and water be boiled up with a little oatmeal, which will break the viscidity of the milk, and be at the same time more easily digested than the latter in an undiluted state. Besides, oatmeal is a much warmer nourishment than wheaten flour, and agrees better with weak stomachs.

Potatoes, if properly boiled, are an excellent and nutritious food. Particular care ought to be taken that they be good, and nearly all of the *same size*; the larger and smaller ones should, therefore, be boiled separately. They must be washed clean, without paring or scraping, and put into a pot with cold water, but not sufficient to cover them; for their own juice will supply the apparent deficiency. If the roots be of a larger size, as soon as they begin to boil, some *cold* water should be poured in, and occasionally repeated, till they are boiled through to the centre: otherwise they will crack and burst on the outside, while the inside will remain half raw. During the time of boiling, a little salt should be added, and the slower they are cooked, the better will be their flavour. As soon as potatoes are done, the water should be poured off, and the roots re-placed over the fire, in order that their moisture may evaporate, and they become dry and mealy; in which state they may be served up, without being previously peeled. This method of boiling or stewing potatoes, is in every respect superior to that of steaming, as by the former process they may be dressed in a shorter time, and will retain no moisture.

Potatoes may be made into puddings, which will both prove an agreeable change of food, and be at the same time uncommonly nutritious. Dr. LETTSOM directs 12 oz. of potatoes, boiled, skimmed, and mashed; one oz. of suet, and

an equal quantity of milk and cheese, to be mixed together with boiling water to a due consistence, and baked. An ounce of red-herring may be occasionally substituted for the cheese, and will give the pudding a flavour which is relished by many....See POTATOES.

Barley-broth is an wholesome and nourishing dish; which, as it may be made with almost every kind of garden vegetable, is never out of season. Onions, leeks, and parsley, generally constitute part of the ingredients, to which may be added cabbage, or greens, turnips, carrots, and peas. These are to be mixed with 4 quarts of water, 4 pounds of beef with the bones, 4 oz. of common barley-meal, and stewed together for two hours, when the herbs may be added, being previously cut small, and likewise a small quantity of salt. The whole should then boil till it be tender, and the fat skimmed off or not, at pleasure. Onions or leeks should never be omitted.

There is another article of domestic economy which is usually classed under the name of *Pottage*, for the making of which we have subjoined one or two recipes:

1. Take 3lbs. of the sticking piece of beef, a part of the skin, or any coarse piece. Boil it in eleven quarts of water for two hours; then add a pound of Scotch barley, and boil it four hours longer, when 6lbs. of potatoes may be added, and half a pound of onions, together with a small proportion of thyme, pepper, and salt. With these may be mixed other vegetables, and half a pound of bacon cut into small pieces. The whole should be boiled over a slow fire, that it may acquire a proper consistence. It will yield three gallons of excellent and nutritious pottage, and has been found amply sufficient for twenty soldiers, without bread; the nature of the food not requiring any. The expence of this was a few years ago about 2d. per. head; but, at the present advanced price of provisions, would at least be double.

2. Take of beef 1 pound, potatoes 2lbs. Scotch barley, one-third lb. a similar quantity of onions, together with a small proportion of salt and pepper, and 3 oz. of bacon. The whole expence of these ingredients will be about 18d. Let them be well boiled in a due quantity of water, and they will afford nutriment sufficient to dine and sup three persons, without requiring either bread or beer.

Messes, or pottages like these, are doubtless far preferable to the common dishes, consisting of fat bacon and cabbage, with which a considerable quantity of bread and beer are always consumed. We, therefore, seriously recommend the adoption of such or similar measures of prudent frugality, to all classes of society, especially at the present period, when all the necessaries of life have, partly from real, and partly from artificial scarcity, been raised to an exorbitant price. Those benevolent minds who feel an interest in this useful enquiry, we are obliged to refer to the "*Reports of the Society for increasing the comforts, and bettering the condition of the Poor*," where they will find the subject minutely discussed, and many gross, though common, errors in domestic economy ably exposed.

DIGESTER, an instrument serving to dissolve solid animal substances, in a manner similar to that performed by the stomach. This

vessel was invented by PAPIN: after putting meat into it, together with a sufficient quantity of water, a lid is closely screwed on, so as to admit no external air. By a moderate fire, the meat will, in the course of six or eight minutes, be reduced to a perfect pulp: by augmenting the heat of the fire, or extending the time of digestion, the hardest bones may be converted into a pulp or jelly. This effect is produced by the most perfect closure of the vessel, which prevents the access or escape of air, so that the reverberations occasioned by the expansion of the aerial fluid, dissolve the whole into an uniform body, and mix the aqueous, saline, oleaginous, and other particles so strongly together, that they cannot be easily separated; but, while hot, appear one liquor, and, when cold, form a jelly, of a strength proportionate to the quantity of flesh or bones dissolved in the water.

This useful instrument has not been hitherto applied to culinary purposes; though within the last two years an imperfect imitation of it has been vended in the shops; and we state with satisfaction, that even the latter is incomparably more economical than the various kinds of stew-pans formerly employed. Cast-iron digesters are now manufactured, of various sizes and prices. We understand that the most complete articles of this description may be had of Messrs. JACKSON and MOSER, Dean-street, Soho; or of Mr. DOWNER, Fleet-street, London; both of whom have, we believe, obtained patents for their improvements in this valuable culinary utensil.

DIGESTION, in animal economy, signifies the dissolution of food taken into the stomach, in order to supply the continual loss sustained by perspiration, the different functions, or by exercise.

As soon as the food is taken into the mouth, it is first broken and divided by the teeth, being at the same time moistened with a liquor supplied by the salival glands, and consequently formed into a kind of paste. Thus prepared, it passes into the stomach to ferment; a process which is effected, 1. By the salival and gastric juices, which have an effect on aliment similar to that of leaven, or yeast, on dough; 2. By the vital heat of the stomach and viscera of the abdomen; 3. By the remains of food, which adhere to the folds of the stomach, and there become acid and acrimonious; 4. By the agitation arising from the pressure of the abdomen, and the continual pulsation of the contiguous blood-vessels; 5. By the liquor which the repeated compression of those muscles causes to be discharged from the glands of the stomach: and, lastly, by air itself, which being mixed with alimentary matter, dilates by the heat of the stomach, and separates the particles of food, which, from the concurrence of these causes, are converted into chyle.

From the stomach, the chyle descends into the intestines, where it incorporates with the blood; which, by its volatile nature, together with the saline and nitrous parts of the air, subtilizes the aliment, and perfects its digestion. These powers, however, are frequently impeded, or weakened, from a variety of causes, too minute to be specified here, but which will be occasionally mentioned in

their alphabetical series. See INDIGESTION.

[DIGITALIS. See FOX-GLOVE.]

DIMNESS OF SIGHT, in farriery, a disorder in horses proceeding from blood-shotten eyes. If the eye-ball be sound, a cure may be effected by keeping the horse warm, with a linen hood fitted to his head, and by anointing his eyes twice a-day with a composition of sugar-candy, honey, and white rose-water. In two or three days, the eyes will be well; after which the creature should be blooded. In the progress of this malady, blisters generally rise on the eye, which it would be dangerous to touch, as they will gradually disappear on the recovery of the animal. See SIGHT.

DINNER, a very significant term in domestic economy, as it expresses the principal meal, or that which should be eaten about the middle of the day.

Although most nations which aspire to civilization, have adopted the custom of taking meals at certain hours of the day, and especially the dinner, yet such practice does not appear to be consonant with the just principles of animal economy, or with a critical regard to health. In the present *artificial* state of society, however, it would probably be attended with many inconveniences, to infringe upon the established order; and to resort to the table, only when we are induced to take food, in consequence of the cravings of a *natural* appetite. But those who are in any degree acquainted with the structure of the digestive organs, will readily agree with us, that the activity of the stomach, in healthy individuals, is never totally suspended, either during profound sleep, or the most intense application to study. And as the whole process of digestion and assimilation is, according to the most attentive observers, performed in about *four* hours, if the stomach has not been unnaturally distended by superfluous food, it follows that it is contrary to the order of nature, to swallow a larger quantity of provisions, at one meal, than we are able to digest during that time.

On the other hand, it will be objected, that the plan, of a *more regular division of meals* could not, without difficulty, be adopted by those who have been insensibly accustomed to take such portions of food as serves them for the support of the whole, or greater part of the day. This frivolous argument, however, will not influence the determination of judicious persons, who value their health, and abhor gluttony. Hence we venture to recommend to those who are disposed to habits of temperance and frugality, but especially to the invalid and convalescent, instead of eating *one* hearty dinner in twenty-four hours, to divide the whole into *three* or *four* moderate meals, to be taken at intervals of four or five hours:....this arrangement will be more consistent with the rules of Nature and of Reason.

[DIRCA PALUSTRIS, Leather wood.

This is a low shrub, and native of the United States, growing in moist shady places, seldom rising more than four feet high, spreading into a head, with many small and very flexible branches. The flowers are produced at the extreme ends of the former years' shoots; they are of an herbaceous colour, and make a tolerable appearance. The flowers, which appear the

latter end of March, before any perfect leaves, are of a yellow colour. The bark is uncommonly tough, yet the enclosed wood is very brittle. It was highly valued by the Native Indians, and used in the place of cords. This plant, according to the information of Mr. W. Bartram, occupies an extensive range of territory, from Canada to Georgia.]

DISCOUNT, in commerce, a term employed by traders, merchants, and bankers; especially by the two former, when they purchase commodities on the usual time of credit, and on condition that the seller allow the buyer a certain discount at the rate of so much per cent. per annum, for the time during which credit is generally given; provided the buyer pay ready money for such commodities, instead of taking the usual time of credit.

Traders and merchants, also, who frequently take promissory notes for money due and payable to them or to their order at a certain date, and who sometimes have occasion for the money before the time elapses, procure these notes to be discounted by bankers before the time of payment, so that the latter deduct the interest which will become due by the time such notes are payable. Bills of exchange are discounted by bankers on similar terms; which indeed constitute a considerable article of the profits of banking....See Interest.

DISEASE, is that condition of the body, in which it has declined from a state of health, so that its different functions are either greatly impeded, or performed with difficulty.

Of all organized creatures, man is subject to the greatest diversity of diseases: some impairing only the use of the part immediately affected; for instance, the palsy, gout, rheumatism, &c.; others disordering the whole body, such as fever, apoplexy, &c.; again, others disturbing the mind, as delirium, melancholy, and the like; and lastly, some attack both mind and body, such as frenzy, accompanied with fever.

Without perplexing the reader with conjectures on the origin and propagation of diseases, we may observe, that in proportion as men associate together in large and populous places, their manners and habits become more refined; while they gradually degenerate in bodily strength, and energy of mind, so that they are less capable of resisting the noxious agency of the elements, and other external powers. This progress towards refinement is always attended with an increase of luxury; the painful effects of which are sooner or later experienced by its votaries. Luxury, indeed, has also afforded the means of lessening the sudden influence of cold, heat, rain, moisture, and other external causes; for we can occasionally guard against their severity; but, on their next return, we are liable to be acted upon with additional vehemence. To this state of things we owe the introduction of many articles, both of food and dress, the consequences of which too frequently prove to be injurious to our bodily welfare. Thus it may be safely affirmed, that the number and variety of diseases, in a great measure depend upon the prevailing refinements in the extensive department of luxury.

The passions are another fruitful source of disorders. Man is perhaps more violently attacked, and more obstinately governed, by

them than any other creature. These emotions variously affect the human body: the most hurtful and oppressive of them, however, are *terror* and *grief;* the former in particular is often attended with the most fatal effects. The remedies to which we resort during the prevalence of passion, too frequently lay the foundation of lingering disorders, both mental and corporeal, in which medicine can afford but precarious relief.

The last source of diseases to which we shall allude, is a variety of specific contagions; the greater part of which is probably generated in the atmosphere. Such is particularly the case with respect to air that is vitiated by putrid, marshy, or noxious vapours, and by the unwholesome effluvia of various manufacturing processes, especially those of combustion, fermentation, and putrefaction. Lastly, there is another and very numerous class of contagious maladies, that perpetually migrate from one individual to another, such as the small-pox, measles, hooping-cough, influenza, putrid fevers, &c. of which we shall treat in their alphabetical places....See also CONTAGION and INFECTION.

Every disease weakens the digestive powers. The diet ought therefore in all cases to be light and easy of digestion. Paying due attention to this circumstance alone, without having recourse to those pernicious nostrums and pretended specifics, now in general circulation, will in a very great measure contribute to the recovery of the patient. Medicines are doubtless of considerable utility, when properly and opportunely administered; but an *indiscriminate* use of drugs (such as prevails among the ignorant and fanciful), cannot fail to be productive of the worst consequences....See CHRONICAL DISEASES.

DISEASES OF PLANTS are divided by TOURNEFORT into the following classes: 1. Those which arise from too great an abundance of sap; 2. From having too little; 3. From its bad qualities; 4. From its unequal distribution; and 5. From external accidents.

An abundance of sap causes plants to vegetate so luxuriantly, that they seldom arrive at the requisite degree of perfection. Wheat is in some climates subject to a disease of this nature, in consequence of excessive vegetation, without producing ripe grain. Such a defect may likewise be artificially induced, by planting any species of corn in too rich a soil:....too much rain will be attended with a similar effect. When a vegetable is supplied too abundantly with juices, it is very apt to rot; one part of it overshadowing the other, so as to prevent the access of fresh air, for want of which it prematurely undergoes putrefaction. In grasses, however, (fescue excepted), or in any herbaceous plant, too great luxuriance, so far from being a disease, is a very desirable property. According to Dr. HOME (" *Principles of Agriculture and Vegetation*") dung is a great preventive of diseases, arising from abundant moisture. The want of nourishment in plants may be easily ascertained by their decay; in which case the only remedy is, to remove from their vicinity such vegetables (and particularly weeds), as impede the growth of those we are desirous to cultivate.

The bad qualities, or unequal distribution of the juices of plants, occasion but few diseases which affect vegetables in this country, so that they are principally liable to external accidents, especially to the depredations of insects, such as snails, caterpillars, grubs and flies, to which we refer. See also BEETLE, CHAFER, CRAB, and CORN-BUTTERFLY.

The diseases which our gardeners chiefly observe, are :

1. *Barrenness* ; when the tree, though apparently fresh and healthy, bears no blossoms ; or, if it produce any, they soon fall ; or, should they *set*, the fruit drops, before it arrives at maturity.

2. *Blasting of the buds*, occasioned by a frost happening while the leaves and blossoms are wet ; in consequence of which the pores are contracted, and the vital juices obstructed : thus, if the sun begins to shine suddenly, they turn yellow, producing round fiery specks, whence frequently proceed tumors somewhat similar to warts, which rot, and generate maggots. Mr. MORTIMER adds, that the want of rain, during the *blossoming time*, often dispose the blossoms to drop, from a deficiency of sap ; to prevent which, he recommends frequent watering.

3. *Blight* ;

4. *Mildew* ;

5. *Moss* ; to which articles we refer.

6. *Rotten roots* ; an incurable disease, occasioned by setting the plants too deep.

7. A kind of *mildew* arising from a thick fog, or too abundant dew ; which, however, affects the plants only in a slight degree.

8. *Falling of the leaves*, caused by the trees sprouting too early, or when they are attacked by too sudden heat or cold.

9. The *Scurf or Leprosy*, a disease which is confined to the bark, and is produced by excessive dilatation of the pores, through which too great a proportion of perspirable matter exudes ; so that by adhering to, and hardening on the bark, it causes the latter to chap and crack, while it obstructs all perspiration. Thus, the viscous rind or skin furnishes a secure retreat for vermin, which live both on the bark and on the tree.

To the various dieases should be added the injury done to trees by deer, hares, and rabbits, barking them. The best defence against the first of those animals, is to *pale* them round, or to paint the lower part of the tree ; but the former method is preferable. Hares and rabbits may be kept off by tying bands of straw round the trunk of every tree, as far as they can reach. Some persons make use of a composition of tar and lime, which certainly is not less injurious to the growth of trees than the depredations of hares or rabbits. In general, where any defence is requisite, straw-bands afford a tolerable security.

DISTEMPER is frequently used in the same sense as disease, but is particularly applicable to *cattle*.... This term implies a species of contagious fever, attended with an inflammation, which is succeeded by a gangrene in the lungs, liver, or intestines. It is always preceded by a shivering and trembling of the limbs, which are followed by various febrile symptoms, such as difficulty of breathing, a sinking in the flanks, and a dryness on the tongue, together with a loathing of the usual food and drink, great

heaviness and debility. Animals affected with the distemper, frequently shed tears; their eyes appear sometimes sparkling and inflamed, but at intervals dull and languid. Their food remains crude in the stomach for several days after it has been eaten, from their inability to digest it.

This contagion spread most rapidly in the early part, and about the middle of last century, over several provinces in France, whence it reached this country, and destroyed great numbers of cattle.... Various causes of this malady have been assigned, but that most generally admitted, is the turning of cattle into rank grass, especially after heavy and frequent showers. Different remedies were then adopted, the best of which appears to be bleeding the infected animal in the earlier stages of the disorder; and the internal use of the Peruvian bark and red wine; or, if these should fail to procure relief, a mixture of that drug and of burdock, about half an ounce of each, pulverized, may be given twice nightly, for two or three succeeding nights, in warm water, which will seldom fail of effecting a cure.... Tar-water, consisting of one quart of tar and four of water, has likewise been administered with considerable success, in the proportion of three quarts or a gallon, according to the size of the animal. Such a dose ought to be given four times every day, but should be gradually lessened, so that the infected creature never receive less than three pints, or two quarts. At the same time it should be carefully housed every night, for several weeks, and the tar-water worked off with warm gruel and malt-mash.

When the pasture is very exuberant, it will be necessary to give purgatives to cattle, especially to cows; as such precaution will most effectually prevent the spreading of this fatal disorder. Hence a correspondent in the *Gent. Mag.* for 1745, judiciously advises large draughts of butter-milk to be allowed, till they are sufficiently purged.

Should, unfortunately, the distemper at any future time become so prevalent as it was in the last century, we would recommend the following directions (extracted from the 358th No. of the *Philosophical Transactions*, for 1714) to be strictly attended to: 1. Those cow-keepers, whose cattle are well, ought not to approach any cows that are sick, nor permit any person who has been with sick cows to come in contact with their own. 2. That not more than ten or twelve cows be kept in a field together (or a still smaller number, if possible); it having been found by experience, that where the disease prevailed among herds of several hundreds, very few escaped. 3. When a cow-keeper perceives any one of his cows to be infected he ought to kill her immediately, before the disease can arrive at any height; such being the only means of preserving the others. 4. All those cows which have been so killed, or happen to die of the disease, ought to be immediately buried with their hides, entirely covered with quick-lime, and afterwards with earth, *not less than six feet deep*. 5. The milking-places and fields where such sick cows have stood or grazed, should be kept clear for two months (or till they have been sufficiently cleansed by rain) before any other cattle be suffered to stand or graze there.

6. The house in which those cows have been kept, ought to be washed very clean, and then smoked, by burning pitch, tar, or wormwood; and to be shut up for three months, at least, before any other cows are housed in them: and 7. That the same method be taken with calves, oxen, and bulls. See also MURRAIN.

DISTILLING, or DISTILLATION, the art of separating or drawing off the spirituous, watery, oily, or saline particles of a mashed body from the grosser and more earthy parts, by the aid of fire; then collecting and condensing them by the application of cold.

This process is generally performed by means of heat raised to a greater or less degree, as circumstances may require. The fire is either applied immediately to the vessels in which the substances are to be distilled, or mediately, by means of water, sand, iron-filings, &c.

The method of distilling at present uniformly adopted, is that by *ascent*, or raising the spirit above the fire; which again is called either *right* or *oblique*. The former process is managed with a common *alembic*, in which the liquor is raised, and then descends or drops into a receiver. This is chiefly used when the nature and consistence of the mash is such, as to admit of a direct ascent; for instance, in vegetables.

Oblique distillation is performed laterally, and in crooked vessels, termed *retorts*. It is employed in distilling those more solid bodies, the particles of which are too heavy to be raised to the top of a common still, or alembic; of this description are salts, and fossils in general.

With respect to the practical part of distilling or refining, we shall first observe, that *the heat should in all cases be as gentle and uniform as possible*. Accidents may be effectually prevented by employing a worm of a proper width, and by rectifying spirits in a *water-bath*; which, if sufficiently large, will perform the operation with all the dispatch requisite for the most extensive business. The vessel in which the rectification is effected, ought to be immersed in another filled with water up to the neck, and loaded with lead at the bottom, in order to keep it firm and steady. The process will thus be managed as expeditiously as if the vessel were placed over an open fire, and without the apprehension of being disappointed; nor will it be necessary at any time to raise the water in the bath to a boiling heat.

[To obtain spirit from fermented liquor is the business of the distiller; but to refine and purify it belongs to the rectifyer. The second operation is so dependent on the first, that unless the distillation be carefully conducted, the rectification will be rendered both tedious and difficult.

The art of distilling malt spirit may be reduced to the following principles. 1. To obtain spirit free from the oil of malt. 2. To raise the vapours in the most economical manner. 3. To condense them as speedily as possible; and 4. To prevent empyreuma.

The first may be done by mixing a small quantity of sulphuric acid with the wash; and the remaining three by a proper construction of the still, and the necessary care in distillation.

The still should be so constructed as to be capable of containing a

column of fermentable matter, considerably broader than high, to prevent the liquor at the bottom from being burnt before the upper part is heated. The top should be as wide as the bottom, to give the vapours free and complete liberty to escape. By the common construction of the stills, they are incessantly returned into the boiler, especially at the commencement of the process.

Various contrivances have been adopted by the distillers to prevent the wash from burning in the still. Mr. ANDERSON'S apparatus answers this purpose effectually.

Rectification is simple and easy, provided the previous operations have been well managed; but if an empyreuma has been contracted in the still, or the fœtid oil has been combined with the spirit, then it becomes more difficult. On the contrary, if these have been avoided, nothing more is necessary than to mix the spirit with an equal quantity of pure water, and recommit it to distillation, when it will come over pure.

When the liquor has been burnt in the still, it ought to be kept, for some weeks, in *charred* vessels: and a quantity of charcoal should be mixed with the spirit and water, previously to the distillation. This will, generally, be found a sufficient remedy for empyreuma, but will not correct the disagreeable flavour communicated from the admixture of the fœtid oil. Many substances have been used for this purpose, none of which, I think, are fully adequate to the end proposed.

Filtration has been recommended, but the oil is so intimately mixed with the spirit that a considerable quantity will pass through the filter. The operation is also tedious, and some of the spirit evaporates during the process. Alkaline salts are frequently mixed with the spirit, previously to rectification, such as the carbonat of pot ash, but more frequently the carbonat of soda. They, however, are both liable to considerable objections, when unassisted by any other substance; for, although they combine with the oil, and, in some degree, prevent its rising in vapours, yet they communicate an urinous flavour to the spirit, which is highly injurious. Neutral salts, *quick-lime*, calcined bones, and chalk, are equally liable to objection, as they do not effectually deprive the spirit of the oil which it holds in solution, and an improper flavour is also contracted from them.

Of the accidents that too often happen in performing the processes of distillation.

Among the accidents which frequently happen in distilling, the least of all is for the operation to miscarry, and the ingredients to be lost. And this being a subject of the greatest importance, we shall treat it with all possible accuracy.

All accidents are occasioned by fire, their primary cause; by want of attention they get too much head, and fear often suffers them to become irremediable.

The first accident which may happen by the fire, is when a distiller, by too great a heat, causes the ingredients to be burnt at the bottom of the still; by this means his liquor is spoiled by an empyreumatic taste, and the tin is melted off from the alembic. An empyreuma resembles the smell of burnt tobacco, and is produced in liquors by too great a degree of heat. To illustrate this, distil any fruit, flowers, or aromatic whatever,

but especially something whose smell is very volatile, draw off only the best, unlute the alembic, and what remains in the still will be found to have a very disagreeable smell; whence it follows that if a little more had been drawn off, it would have spoiled what was before obtained.

If the fire be too violent, the extraordinary ebullition of the contents causes them to ascend into the head; and, if a glass alembic, they fall ignited into the recipient; the heat breaks it, the spirits are dissipated, and often take fire from the heat of the furnace.

If the fire be too strong, the bottom of the still becomes red hot, the materials inflamed, and consequently the fire reaches the recipient.

When an earthen alembic is used, the closest attention is requisite to keep the fire from burning the materials at the bottom.... The head, which is always of glass, bursts, and the spirits are spilt, and often catch fire. And the remedy becomes the more difficult, as earth retains the fire much longer than a common alembic.

If the alembic be not firmly fixed, it is soon put out of order, falls down and unlutes itself; thus the liquor is spilt, and the vapour sets the spirits on fire.

If all the joints be not carefully luted, the spirits at their first effort issue through the least aperture, run into the fire, which is propagated into the alembic by the vapour.

In distillations where the phlegm ascends first, its humidity penetrates the lute, and loosens it, so that when the spirituous vapours ascend, they are exposed to the same accident.

Lastly, when the recipient is unluted, especially if near full, without the greatest circumspection the spirits will be spilt, and so catch fire.

Hitherto, I have only given a simple account of what daily happens to distillers; but the consequences of these accidents are infinitely more terrible than the accidents themselves; for an artist to lose his time, his labour, and goods, is no small matter; but it follows from what we have premised, that both his life and fortune are in danger from these conflagrations. Instances of the former are too common, as well as those of the latter, relating to the danger to which the operator is exposed. They are evident, and I have seen very lately, three instances sufficient to intimidate the most sanguine. The spirits catch, the alembic and recipient fly, and the inflamed vapour becomes present death to all who breathe it.

The rectifiers who perform the most dangerous operations of distillery, are particularly exposed to these terrible accidents; the fineness of the spirit, at the same time that it renders it more inflammable, also causes the fire to spread with the greater rapidity. And when their store houses are once on fire, they are seldom or never saved.

To prevent accidents, two things especially must be known, and adverted to.

1. The knowledge of the fire, which depends on the fuel, whether wood or coal.

2. The manner of luting, so as to prevent the vapours from escaping through it, and by that means of setting the whole on fire.

It is evident that the larger the alembic, the more fire is necessary.

What has not been digested, also requires more fire than that which has been prepared by that operation. Spices require a stronger fire than flowers ; a distillation of simple waters, more than that of spirituous liquors.

The surest way of ascertaining the necessary degree of fire is, to regulate it by the materials, as they are more or less disposed to yield them spirits, &c. and this is done as follows. The operator must not leave the alembic, but attentively listen to what passes within, when the fire begins to heat it.... When the ebullition becomes too vehement, the fire must be lessened, either by taking out some of the fuel, or covering it with ashes or sand.

It requires a long experience in the several cases, before a distiller can acquire a competent knowledge in this important point. Nor is it possible to determine the degree of fire from the quantity of fuel ; judgment, assisted by experience, must supply this defect.

Every thing being determined with regard to the degree of fire, we shall now proceed to explain the method of luting alembics.

By the term luting an alembic, we mean, the closing the joints through which the spirits might transpire.

Lute is a composition of common ashes, well sifted, and soaked in water ; clay, and a kind of paste made of meal or starch, are also used for this purpose ; which, as I before observed, is to close all the joints, &c. in order to confine the spirits from transpiring.

Good luting is one of the surest methods for preventing accidents. An alembic, where all transpiration is prevented, having nothing to fear but the too great fierceness of the fire ; and that may be regulated by the rules already laid down.

The refrigerating alembic is mostly used. The body and the head are joined to each other ; but notwithstanding the greatest care be taken in luting the juncture, there will still be some imperceptible interstice for transpiration ; and the least being of the greatest consequence, a piece of strong paper should be pasted over the joint, and the alembic never left, till the spirits begin to flow into the receiver, in order to apply fresh paper, if the former should contract any moisture. The master himself should carefully attend to this, and whatever precautions may have previously been used, the eye must be constantly upon it.

The alembic, when vinous spirits are distilled, should be luted with clay, carefully spread round the junctures, in order to prevent all transpiration ; because the consequences here are terrible ; for when the fire catches a large quantity, it is often irremediable. Besides, as this earth cracks in drying, it must be often moistened, and fresh applied, on the first appearance of any occasion for it.

The retort is also luted with clay ; but as glass retorts are also used, they are often coated with the same clay, to prevent their melting by the intenseness of the fire.

Lastly, the earthen and glass alembics are luted with paper and paste, as above. Having thus explained the great consequence of circumspection with regard to luting, and the degree of fire, we

shall now proceed to the third method of preventing them.

Of the remedies for accidents, *whenever they happen*....

The most essential, are courage and presence of mind; fear only encreasing the misfortune.

1st. If the fire be too violent it must be covered, but not so as totally to prevent its action, as by that means the process of the distillation would be interrupted, and render it more difficult and less perfect.

2d. When the ingredients burn, which you will soon discover by the smell, the fire must be immediately put out, in order to prevent the whole charge of the still being entirely spoiled, which would otherwise inevitably be the consequence.

3d. If the spirits should catch fire, the first care is to unlute immediately the receiver, and stop both the end of the beak and the mouth of the receiver with wet cloths.

The fire must then be put out, and if the flame issued through the luting, the joints must be closed with a wet cloth, which together with water, should never be wanting in a distil-house.

4th. If the alembic be of earth, and the contents burn at the bottom, the fire must be immediately put out, the alembic removed, and water thrown upon it, till the danger is over; and for farther security covered with a wet cloth.

5th. If after your care in closing the junctures to prevent transpiration, you perceive any thing amiss, while the spirits are ascending, apply clay, or any other composition, in order to stop the aperture, and have always a wet cloth ready to stifle the flame, if the spirits should take fire.

6th. If the heat detaches the lute, or it becomes moist, immediately apply another, having always ready what is necessary for performing it. Should the transpiration be so violent, that you cannot immediately apply a fresh lute, clap a wet cloth round the joint and keep it on firm and tight, till the spirits have taken their course. But if notwithstanding all your efforts the transpiration should increase, so that you fear a conflagration, remove the receiver as soon as possible from the fire, and afterwards your alembic, if portable; but if otherwise, put out the fire immediately.

7th. The charge being worked off, be cautious in luting the receiver, that nothing be spilt on the furnace, and carry it to some distance from it, that the spirits exhaling may not take fire.

8th. Lastly observe, that whenever a remedy is required, there must be no candle used; for the spirituous vapours easily take fire, and propagate the flame to the vessels from whence they issue.

All that has been hitherto said, concerns only the management of the alembic; but what remains, is still more interesting, and relates to those who work it, that they may not by conquering the accident, destroy themselves.

On discovering any of the above accidents, when the flame has not yet reached the spirits, let the remedies already mentioned be applied, either with regard to the lute, or the violence of the fire. ....But if the flame has reached the alembic, the following precautions are to to be used.

The operator must not approach the alembic without a wet cloth over his mouth and nostrils, it being immediate death to inhale the inflamed vapour.

In hastening to stop any accident, be careful to approach the side opposite to that whither the air impels the flame; for, without this precaution, you would be involved in it, and could not without the utmost difficulty, extricate yourself from it.

If, notwithstanding this precaution, the eddy of the air should force the flame to your side, quit the place immediately, and do not return till its direction be changed, always taking care to have a wet linen cloth before your nose and mouth, and keep yourself on the side opposite to the direction of the flame: and also to have another such cloth, in order to smother the flame, and close the crevice through which the spirits issue.

Should it be your misfortune to be covered with inflamed spirits, wrap yourself in a wet sheet, which should always be ready for that purpose. Self-preservation is of too great importance, that any of these precautions should be omitted in such variety of dangers.

If the fire has acquired such a head that it cannot be stopt, the receiver must be broke, and the alembic, if portable, thrown down; but no person must be suffered to go near them, especially those who are strangers to the business.

In a desperate case, like that of a large quantity of rectified spirit taking fire, if time permit, the communication of the beak of the alembic, with the recipient, which is usually a cask, must be cut off, by closely stopping the bung; and be sure no candle come near the receiver, leaving the rest, as the danger would be too great to expose one's self to the flames of a large charge, and the distiller's safety should be principally considered.]

A patent was granted in July, 1773, to Mr. Tho. Danforth, of Charlestown, in the Province of Massachusetts Bay, for his invention of a method of condensing the vapour arising in distillation: as the term of his privilege is now expired, we insert the following particulars. The whole improvement consists in making the worm-vessel, or that containing the water to cool the worm, or vessel which receives the steam or vapour to be condensed (whether the steam-vessel be a worm, strait tube, or of any other form), so that it may act in a manner similar to a syphon or crane; and, upon the same principles, by making it air-tight; excepting a communication by a tube or part of the vessel itself, with the water that supplies it, and an aperture from a tube or part of the vessel, below the horizontal level of the surface in the reservoir where it first enters; in order that the water may escape in the same proportion of time and quantity, as it flows into the vessel in the reservoir.

Another patent was obtained, in February 1797, by Mr. John Falconer Atlee, of Wandsworth, Surrey, distiller, for his invention of an improved method of condensing and cooling spirits in the process of distillation, by means of machinery not hitherto used for that purpose; but as this complicated process does not relate immediately to domestic economy, we

refer the reader to the 7th vol. of the *Repertory of Arts and Manufactures*.

[Of the many patents for improvements in distilling, which have been granted to ingenious men within a few years, both in Europe and America, none have been more deservedly obtained than that obtained by A. Anderson, Esq. formerly of Philadelphia, but at present residing at Lamberton, New-Jersey. Mr. A's patent is taken out in general terms, "for making use of steam arising in distillation, for heating wash or any subject to be distilled, by means of a condensing tub in which the wash is so placed as to receive the whole heat of the steam, the wash at the same time condensing the steam." The process saves wood and labour, in the proportion of 3 to 1 of the common stills. At the works of Messrs. Anderson and Hall, Lamberton, two stills are in operation, of 110 gallons each, each of which charged with 90 gallons is run off *twelve times in 24 hours.*

Explanation of the annexed engraving of Anderson's Patent Condensing Tub.

A. Still to contain 110 gallons, exclusively of the head, as near this shape as possible.

B. Half globe made of copper 30lb. to the sheet, bottom of copper a thimble on the center of the top, 24 inches in the bottom, and 16 high.

C. Tub for holding the charge of wash, 36 inches wide in the bottom, 33 at top, and 34 deep, made of $1\frac{1}{4}$ cedar or white pine.

D. Small brass cock, to be opened when the charge is let into the still from the tub.

E. Stuffing box made of copper, to prevent the steam escaping by the spindle; the box stuffed with tow, and screwed down fast.

F. Pipe from the head of the still, $4\frac{1}{2}$ inches wide.

G. Pipe: the lower end fitting into the pipe F, and receiving the pipe H, and large enough to slip up on the pipe H, so as to leave the head free to be taken off.

H. Pipe: the lower end fits into the pipe G, and passes through the bottom, 4 inches, to prevent the condensed steam returning into the still, and fastened firmly in the bottom of the half globe.

I. Pipe to convey off the condensed steam into the worm, fitted even in the bottom of the half globe; the other end fits into the mouth of the worm.

K. Iron spindle, with its handle to stir the still, with the cross piece and chains.

L. Charging pipe, 3 inches wide, with a large cock screwed into the bottom of the tub, and the lower end fitting into the pipe M, in the breast of the still.

N. Stuffing box made of wood.

O. Spindles when used by water.

Mr. Anderson informs the editor that he contrived a still precisely similar to that mentioned by Chaptall, and used it five months, in 1795, before he had heard of a similar one being used in France, but he discontinued it, as he found it troublesome, from being liable to run foul very often, and inconvenient when the head was to be taken off.]

In the distillation of compound spirits, such as clove, lemon, citron-water, and the like, the process in no respect varies from that adopted in distilling brandy, &c.; much, however, depends on the

practical attention paid to the following general rules: 1. The distiller of such liquors must be careful always to employ a pure, rectified spirit, or one freed from its own essential oil. For, as compound water consists of a spirit impregnated with the essential oil of the ingredients, it is requisite that this spirit should have deposited its own oily particles. 2. Let the time of previous digestion be proportioned to the tenacity of the ingredients, or the weight of their oil. 3. Let the strength of the fire also be adequate to the weight of the oil intended to be raised with the spirit. 4. Let only a due proportion of the finest particles of the essential oil be united with the spirit; as the grosser and less fragrant parts of such oil impart to it an unpleasant taste. This object may in a great measure be effected, by leaving out the *faints*, and, instead of them, *making up to proof* with soft water.

If the above-stated rules were carefully attended to, this branch of distillation might be rendered more perfect than it is at present. Nor would there be any occasion for using burnt alum, isinglass, whites of eggs, &c. to *fine down* cordial waters, which, by the process suggested, may be rendered clear, sweet, and of a pleasant flavour, without any farther trouble.

For the information of those who are unacquainted with this process, we shall here subjoin a few directions for making a few of such compound waters or spirits as are in more general estimation.

1. *Clove-water:* Take 4 lbs. of bruised cloves, half a pound of pimento, or all-spice, and 16 galls. of proof spirit. Digest the mixture in a gentle heat, and then draw off fifteen gallons, with a somewhat brisk fire. The water may be coloured red, either by a strong tincture of cochineal, or of corn-poppy flowers; and sweetened at pleasure with double-refined sugar.

2. *Lemon-water:* Take of dried lemon-peel 4 lbs.; pure proof spirit, 10½ galls. and one of water; draw off ten gallons by a gentle fire, and dulcify the compound with fine sugar.

3. *Citron-water:* Take of the dry yellow rinds of citrons, 3 lbs.; of orange peel, 2lbs.; bruised nutmegs, three-fourths of a pound; clean proof spirit, 10½ gals. and one of water. Digest them in a moderate heat; then draw off ten gallons, and add the requisite proportion of fine sugar.

4. *Orange-water:* Take of the yellow part of fresh orange-peel, 5lbs.; clean proof spirit, 10 gallons and a half; water, 2 gallons; and draw off ten, over a slow fire.

5. Ratifia, which see.

6. Usquebaugh, to which we refer.

[For additional receipts to make the above and other liquors, see the several articles.]

For an account of the different duties and penalties imposed on British spirits, we refer to the article Spirits....The curious reader will also find many ingenious and useful hints in Mr. Cooper's "*Complete System of Distillation.*"

DISTORTION, is that irregular growth, or unnatural motion, by which any part of animal bodies becomes deformed. Although this term is generally used to express an uncouth contraction of one side of the mouth, yet in this place we shall treat chiefly of those distortions of the bones which proceed either from external injuries, or

diseased constitutions, such as a morbid state of the bones, contracted muscles, &c. This affection most frequently appears in rickety or scrophulous children, or adults of a very delicate and debilitated frame.

Distortions of the spine often arise in consequence of continuing too long in any particular posture; a circumstance which ought to be attended to from the very commencement of the complaint..... Hence the patient should be accustomed *gradually* to turn himself to the opposite side, and to sleep upon a firm hair mattress, where his body may lie on a more equal surface than in the effeminating feather-bed. At the same time, a nourishing and regular system of diet, sometimes the cool, at others the cold-bath, should be employed, conjointly with such strengthening remedies as are conformable to the nature of the case, and the constitution of the individual. By these means, the disease has in many instances been controlled in its progress; though a radical cure cannot always be effected.

Several machines and instruments have been invented by ingenious men, for removing distortions of the spine, by pressure; but as their application requires considerable skill and attention, we think it our duty to caution those, who may be obliged to resort to such expedients, against the pretensions of the illiterate. In many cases, however, where the patient was not too long neglected, the use of the common collar has been attended with advantage. There is another contrivance called *spinal stays*, with certain machinery adapted to them, which was invented in France, and afterwards introduced into this country by the late Mr. P. Jones, who on account of the improvements he made on this article, is generally considered as the original inventor. Still, therefore, great merit is due to that skilful man; and as his widow, for the benefit of her family, now conducts the business (No. 23, Charlotte-street, Bedford-square), and has been in the constant habit of personally attending on females, we venture to recommend her to the patronage of the public.

Causes similar to those before enumerated, also, produce distortions of the limbs. As, however, this subject is more connected with the practice of surgery, than that of domestic medicine, we decline the farther discussion of it; having already communicated a few appropriate remarks under the head of Bandy-legs.

DITCH, in agriculture, a common fence, or inclosure, in marshes or other wet lands, where hedges cannot be conveniently planted.

Ditches are generally allowed six feet in width at the side of broad highways, and five feet in commons. But those trenches dug at the foot of the bank on which the quick is raised, are in general only three feet wide at the top, one at the bottom, and two feet deep.... Thus, each side acquires a slope, which is of great advantage: for, in ditches made perpendicular, the sides are continually washing down; and if cattle descend into a narrow-bottomed ditch, they have no room to turn themselves, so as to crop and injure the quick. Where a ditch is four feet wide, it should be two and a half deep; and if it consist of five in width, it ought to be three in depth; or if it be

wider, the depth should be increased in porportion.

DITCHING, LAND: See LAND.

DITTANDER: See PEPPER-WORT.

DITTANY, the WHITE, or *Dictamnus Fraxinella*, L. an exotic perennial plant, growing in France, Germany, and Italy. Its thick, pungent, and bitter root, produces annually erect stalks, which bear loose spikes of white, red, and purple flowers, in June and July.

This plant may be easily propagated in gardens, either by seeds, or by dividing the roots; it is eminently calculated for ornamenting borders. In smell and taste, the leaves of the dittany resemble lemon-thyme, but possess a stronger aromatic flavour, as well as a greater degree of pungency: when fresh, they yield, on expression, a considerable quantity of an excellent essential oil. The flower-cups exude a very pure and fragrant resin, which, if taken internally, is, according to BECHSTEIN, productive of diuretic effects. As these flowers exhale a considerable proportion of inflammable air, they ought not, in any large quantities, to be kept in dwelling rooms.

[DIVINING-ROD. The *Virgula divinatoria*, or divining rod, is a forked branch, or two shoots, or young branches of a fruit-bearing tree, tied together at one end, and held by the other ends, one in each hand. When held in a certain position, and under certain circumstances, it is said to discover the situation of metals, &c. in the earth, by dipping as it approaches the place beneath which they immediately lie.

It is not known who was the discoverer of it; but AGRICOLA, in his treatise, *De Re Metallica*, ascribes it to the magicians: it was ably supported in France, by DE THOUVENEL, about the middle of the 18th century; and soon after, by a philosopher of unimpeachable veracity, WILLIAM COOKWORTHY, of Plymouth, who repeatedly made experiments with it, and discovered by it, a copper mine, which was worked for several years; and some intelligent practical miners in the county of Cornwall, continue to believe in its virtue.

In the 13th vol. of TILLOCK'S *Philosophical Magazine*, there is a paper, by W. PHILIPS, on the subject, from which the above note is taken; and to this paper, the reader who may be anxious to satisfy himself with a more full account of the divining rod, is referred. The reporter details the rules given by those who used it, and the theories by which they attempted the explanation of its action; and concludes by remarking, "if really there be any virtue in the rod, that, as in the instances of the magnetical influence and electric fluid, it is one of those mysterious effects of the mysterious laws by which nature is governed, inscrutable to human wit, and indefinable by human investigation.]

DIURETICS, a term applied to those medicines which increase the secretion of urine in the kidneys. Their operation consists in promoting the circulation of the blood towards the renal arteries, rendering that vital fluid more serous, and at the same time stimulating the secretory organs.

The use of diuretics, in general, is indicated by the following circumstances: 1. An interrupted or diminished discharge of urine: but, as this complaint may arise from a great diversity of causes, such as

spasms, acrimony of the fluids, relaxation of the solids, plethora, &c. great circumspection is necessary in the choice of medicines properly adapted to the nature of the case. 2. A natural tendency of the constitution to evacuate the morbid matter of a particular disease, by this passage: the symptoms of which are, a frequent inclination to make water; a dark, turbid, and copious urine. 3. An earthy, alkaline, scorbutic quality of the fluids. 4. An abundance of aqueous humours in the body, in general; or an extravasation of them, in particular parts. 5. A local accumulation of impurities in the urinary passages.

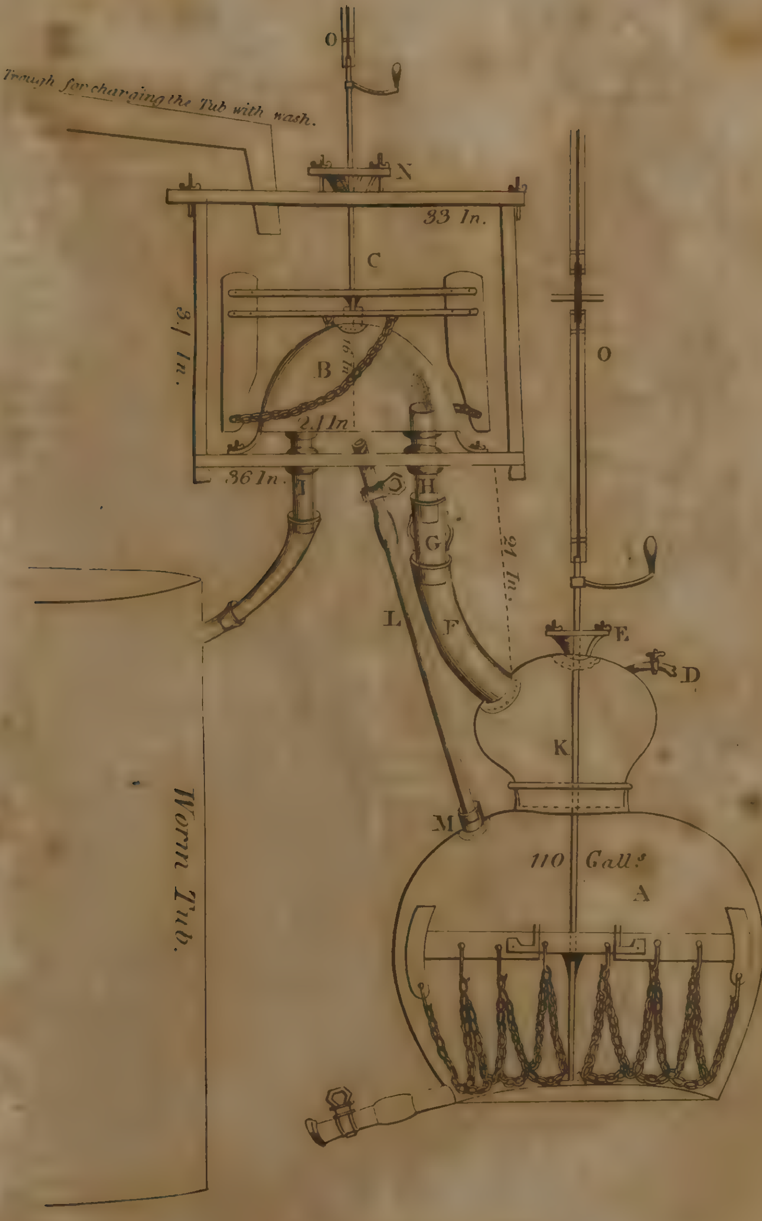
On the contrary, *diuretics* should never be resorted to in the following cases: 1. In diabetes, or an immoderate and long-continued evacuation of urine. 2. When this fluid is mingled with blood. 3. In inflammations of the kidneys and bladder. 4. In violent spasms, when there is reason to apprehend that stones are confined, or other organic defects prevail, in the urinary canal. 5. In those profuse states of perspiration, termed *critical*. 6. When the patient's body is already deficient in aqueous humours.

In the same proportion as we make use of thin, diluent liquors, the quantity of urine may be either increased or diminished: frequent drinking of such watery beverage is, therefore, one of the mildest diuretic remedies. This effect may be considerably promoted by the addition of such substances as specifically act upon the kidneys. To this class belong all the mineral waters containing saline ingredients, as well as the juices of mild summer fruit mixed with water, and particularly the sap extracted from the birch-tree.

Those who are under the influence of diuretic medicines, ought to observe a cool rather than a warm regimen; because heat promotes perspiration, and lessens the secretion of urine. During the use of such remedies, considerable benefit may be obtained by conjoining them with those articles of vegetable nutriment, which naturally operate on the kidneys. Of this kind are the tops of asparagus and hops, the sweet cicely, lettuce, parsley, celery, all the subacid fruits, such as cherries, currants, raspberries, strawberries, grapes, mulberries, apricots, peaches, &c. Beside these, we possess various and more powerful diuretics among plants, for instance, the horse-radish, onions, and garlic, neither of which, however, ought to be indiscriminately taken. One of the most efficacious remedies of this description, is the expressed juice of the common radish (*Raphanus sativus*, L.) mixed with sugar to the consistence of a thin syrup, and taken in doses of one or two spoonfuls, every three or four hours, or oftener.

DOCK, or *Rumex*, L. a genus of perennial plants, comprising 39 species, of which eleven are natives; and of these, the following are the principal:

1. The *crispus*, or Curled Dock, which is found in meadows, pastures, on road-sides, and in almost every cultivated soil: it flowers in the month of June or July; its erect stalk attains the height of three feet. In the county of Norfolk this plant vegetates most luxuriantly, and is the pest of clover fields, from which it is very difficult to be extirpated. It is refused by horses, cows, and goats....Ac-



ANDERSON'S

Patent Condensing Tub.

cording to Dr. Withering, the fresh roots of the curled dock, when bruised and made into an ointment, cure the itch; and its seeds have been given with success in cases of dysentery. In Germany, a decoction of the root is employed by country people for the cure of the scab, and other eruptions in cattle. The whole plant has been advantageously used on the Continent, for tanning or currying leather.... In early spring, the leaves may be boiled like spinach; and the peasantry abroad frequently smoke them instead of common tobacco. Bechstein informs us, that the dried seeds afford flour and bread.

2. The *acutus*, or Sharp Dock, which is common in woods, hedges, on the sides of rivers, and roads, and is sometimes found in fields and meadows. Its stalk grows frequently six feet high; and the flowers appear in June or July. This plant is refused by cows and horses. The roots, however, are employed by dyers, and with the addition of alum and cream of tartar, give a variety of shades, from a straw-colour to a fine olive: they impart a beautiful deep green to cloths that have been previously dyed blue.... The whole plant has been recommended to tanners as an useful substitute for oak-bark.

3. The *aquaticus*, or Water Dock, growing in peat-marshes, wet ditches, pools, at the sides of rivers, and in shallow water. It flowers in July and August, and is succeeded by large seeds....This plant affords a medicine of considerable efficacy, when applied externally, as a wash for spongy, putrid gums; its roots, when pulverized, have been found excellent for cleaning the teeth. These roots are of a bitter, astringent taste, and have often been employed for the cure of scorbutic and cutaneous disorders, whether administered internally, or applied externally in ointments, cataplasms, lotions, or fomentations. Decoctions of the leaves are, likewise, an efficacious laxative, and have been taken with advantage in rheumatic pains, and chronical diseases, occasioned by costiveness, or by visceral obstructions. The dose usually given, is a decoction of half an ounce of the fresh roots, or from one to two drams of them, in a dry state.

4. The *obtusifolius*, or Broad-leaved Dock, which grows among rubbish, in farm yards, courts, parks, and at the sides of ditches: it flowers in the month of July or August....Fallow-deer are extremely fond of this species, as well as of the sharp dock, and eat them both with such avidity down to the root, that neither of them is found thriving in a park.

5. The *acetosus*, or Sorrel-dock: See Common Sorrel.

6. The *acetosella*: See Sheep's Sorrel.

All these species of the dock are but seldom cultivated; as they so easily multiply by their numerous seeds, that, where they are once admitted, they become very troublesome weeds, and their extirpation calls forth every exertion of the industrious farmer.

Dock-cresses: See Nipplewort.

Docking: See Horses.

DODDER, or *Cuscuta*, L. a genus of plants, of which two species are natives:

1. The *Europoea*, or Greater Dodder, a very pernicious weed, that chiefly attaches itself to clover, hops, flax, nettles, and willows, and flowers in July or August. Its leaves

are scarcely visible, and it ought to be timely extirpated, before the seeds become ripe....The whole of this plant is bitter, and is eaten by cows, sheep, and hogs; but goats do not relish it, and horses totally refuse it....In dyeing, it affords a pale reddish colour.

2. The *Epithymum*, or Lesser Dodder, which is common in corn-fields and heaths, but is found chiefly preying on thyme, whence it has received its name. It is in bloom from July to August. This plant is reputed to be aperient and cleansing, as well for curing the jaundice as cutaneous disorders, &c. In this country, however, it is seldom used, though, from its pungent aromatic taste, it may with advantage be substituted for many drugs that are now imported.

Both these species are plants of a most singular nature, being almost destitute of leaves, parasitical, creeping, and fixing themselves, to whatever is next to them. They decay at the root, and are afterwards nourished by the plants which support them. As soon as the shoots have twined about an adjacent plant, they put forth from their inner surface several vesicles, or papillæ, which attach themselves to the rind or bark of the plant. By degrees, the longitudinal vessels of the stalk, which appear to have accompanied the vesicles, shoot from their extremities, and penetrate the softer plant, by dividing the vessels, and insinuating themselves into the tenderest parts of the stalk; and so intimately are they united with it, that it is much easier to break, than to disengage them.

[3. *Americana*, or American Dodder. This is a branching, leafless, twining, parasitical plant, tender shining, and yellowish. Flowers small, without scent, aggregate, yellowish or greenish. This plant is used to dye yellow.]

DOE: See DEER.

DOG, or *Canis*, L. a genus of animals supposed to be originally natives of China, and consisting of more than thirty species, of which that most generally known is the *familiaris*, or domestic dog: this again produces several varieties.... See BLOOD-HOUND, MASTIFF, HOUND, SPANIEL, GREY-HOUND, TERRIER, &c.

Dogs are remarkable for their great docility, fidelity, and affection for their master. These useful creatures guard our houses, gardens, and cattle, with spirit and vigilance. By their assistance we are enabled to take both beasts and birds, and also to pursue game through the waters as well as over land; nay, the Norwegians render them also useful in fishing. In general, they live to the age of fourteen or fifteen years, and seldom survive twenty: the female breeds during the first year, and produces from six to twelve puppies, after a gestation of about nine weeks. Those of a small size bring forth five, four, and sometimes only two. The whelps are generally blind, and cannot open their eyes till the tenth or twelfth day. In the fourth month, they lose some of their teeth, which are soon succeeded by others.

The dog is an animal of quick motion, and remarkable for travelling long journies. He easily follows his master, whether on foot or on horse-back, for a whole day; and, when fatigued, does not sweat, but lolls out his tongue. It is peculiar to dogs, before they lie down, to run about in a circular direction,

with a view to discover the most proper situation for rest. They sleep little, frequently starting, and seem to hear with more acuteness, than while awake.

Dogs possess the sense of smelling in a very high degree. They can trace their master by the smell of his feet in a church, or in the streets of a populous city. In a savage state they are of a fierce, cruel, and voracious disposition; but when civilized, and accustomed to live in the society of men, they acquire every endearing quality. Gentle, obedient, submissive, and faithful, they appear to have no other desire than to serve and protect their master....These qualifications, added to their very great sagacity, justly claim the esteem of mankind. Accordingly, no animal is so much caressed or respected: in short, dogs are so tractable and so much disposed to please, that they assume the very air and temper of the family to which they belong.

With regard to the qualities of dogs, those reared in Britain are generally considered superior to the dogs bred in any foreign climate. Other nations of Europe uniformly acknowledge their superiority, by adopting English terms and names, while they thankfully receive the creatures as presents. It is remarkable, however, that almost every kind of British dogs greatly loses its excellence in foreign countries; and that no art whatever can prevent this degeneracy.

Proper management of dogs...... As these are, at all times, very valuable animals, it is matter of some importance to take care of their health. This depends much on their diet and lodging: the frequent cleaning of their kennels, and giving them fresh straw for their couch, are highly necessary; or, during the summer, deal-shavings may be substituted for straw, as the former will prevent the breeding of fleas. If they be rubbed with chalk, and brushed and combed once or twice a week, they will thrive much better; the chalk will clear their skin from all greasiness, and they will be less liable to the disorder called the *mange*.

Dogs are of a very hot nature; hence they should always be provided with clean water, that they may drink when thirsty. With respect to food, carrion is by no means proper for them, as it must hurt their sense of smelling, in which their excellence in a great measure consists. Barley-meal, the dross or grossest part of wheaten flour, or both mixed together with broth or skimmed milk, afford very wholesome nourishment...... On account of the sanguine constitution of these animals, the greatest relief to them in summer is Couch-grass, or Dog's-GRASS, to which we refer. Those who keep a complete kennel of dogs, should purposely cultivate this plant, in a place into which they may be turned every morning: here they will eagerly eat it, to relieve the disorder to which they are subject, and thus to cure the uncommon heat of their blood.

These animals are liable to various diseases; of which we shall mention only the following:

1. *Bites* and *stings*. If dogs are bitten by any venomous reptiles, such as snakes, vipers, &c. the blood should be squeezed out, and the part washed with salt and urine: a plaster composed of ca-

lamint, pounded in a mortar, and mixed with turpentine and yellow wax, till it acquire the consistence of a salve, should then be applied to the wound. A draught, consisting of an ounce of treacle dissolved in wine, if given to the animal affected, will greatly contribute to its recovery.

2. *Mange*, to which we refer.

3. *Poison*. If there be reason to suspect that a dog is poisoned with *nux vomica* (which is often employed for that purpose by warreners, and causes convulsive fits), the most effectual remedy is to make him swallow, without loss of time, a considerable quantity of common salt, dissolved in the smallest proportion of water: this simple remedy may be administered by opening his mouth, and placing a stick across, to prevent him from shutting it, while his throat is filled with the solution. Thus, by holding his mouth upwards, a sufficient dose may be introduced, both to purge and vomit him. As soon as the stomach is properly cleared by a free passage downward, some warm broth should be frequently given to relieve his extreme faintness, which otherwise might prove fatal.

4. *Worms*; a disorder, with which young dogs in particular are very frequently troubled. All bitter substances are so offensive and nauseous to worms, that they are often voided in consequence of the animals taking two or three common doses of aloes, in the course of a week. Should this remedy fail, an ounce of the powder of tin, mixed up with butter, may be given in three potions, which generally destroys the worms, together with their seed.

5. *Coughs* and *Colds*. Dogs are very subject to a cough, attended with extraordinary paroxisms of choaking, which is often the consequence of a cold. In this case, it will be necessary to bleed the animal affected, in small quantities; but if the disorder proceed from what is called the *distemper* in dogs, and they appear to be very low in spirits, blood-letting must not be attempted. Meat-broth, or milk-broth warmed, should then be the principal part of their diet, and the following medicine administered: Take flour of sulphur, cold drawn linseed oil, and salt-petre, of each one ounce; let them be well mixed together, and divided into four doses; one of which is to be taken every other day. Meanwhile, the creature affected should be furnished with plenty of clean straw to lie upon, and likewise swallow, at least, one spoonful of honey every day.

6. The *scab*, or *itch*, though a rare disease in dogs, is sometimes very obstinate: it may, however, be easily cured by an ointment made of hog's lard and sulphur, with which a part of the back of the animal should be rubbed every day, and the application gradually extended, till the whole back from head to tail, and at length all the affected parts, have been anointed. Thus, the requisite portion of sulphur, which is a specific in those cases, will be introduced into the system, both by absorption, and the constant licking of the diseased creature.

7. *Madness*. See Bite and Hydrophobia.

Dogberry-tree. See Cornel-tree.

DOG-FLY, or *Cynomia*, L. a genus of insects common in woods, and among bushes: they are par-

ticularly troublesome to dogs, and usually seize upon their ears; it is believed, that they can be prevented only by being killed.

These vermin sting very severely, and always raise a blister in the part they touch. They have no trunk, but are provided with two teeth similar to those of wasps, and on the whole, resemble the large flat, black fly, which peculiarly molests cattle. Although we possess no evidence of experience, yet it may be rationally supposed, that anointing the neck and ears of animals, especially those of dogs, in very hot seasons, either with the juices or decoctions of bitter and resinous plants, would afford a good preventive. For this purpose, we would recommend the tops of the fir-tree, the leaves of walnut and chesnut trees, those of the various species of dock, &c.

DOG's-GRASS, or Couch-grass, or Couch-wheat, *Triticum repens*, L. is an indigenous, perennial plant, which grows on arable lands: it is also frequently found near the sea-coast, and continues in flower from June to September.

This is an extremely troublesome weed, as every joint of its fibres will grow; and so very luxuriant is its vegetation, that a single small joint, when transplanted, has been found to cover a superficial square yard of land, in twelve months....Various remedies have been tried to eradicate it; but the most successful is that of laying the land fallow, in a dry summer; and frequently harrowing it to draw out the roots: where this is carefully practised, the soil may be so completely cleared of them, in one summer, that the remaining roots will not materially injure the future crop. A still more effectual mode of extirpating them, is to sow on such land, only those vegetables which require the horse-hoeing culture; for, where the soil can be frequently stirred, or harrowed, that operation will considerably tend to clear it from the roots of this grass, and also of many other noxious weeds.

At Naples, the roots of the couch-grass are collected in large quantities, and sold in the market, as food for horses. They have also been successfully tried in Britain, for the same purpose; and may be safely substituted for oats; as horses prefer them to the latter. They possess a sweet taste, somewhat similar to that of liquorice; and, when dried and ground to meal, have in times of scarcity been converted into bread....Cows, goats, and sheep, eat the leaves, which are also occasionally swallowed by dogs, instinctively to excite vomiting, and to cool their hot blood.

Decoctions of the roots of couch-grass are used in medicine, and reputed to be aperient, diuretic, and of considerable service against the stone in the bladder. The juice of the leaves and stalks was greatly esteemed by Boerhaave, who recommended it to be drunk in considerable quantities, by patients troubled with obstructions in the viscera; particularly in cases of scirrhous liver, and in the jaundice. Cattle have frequently indurated livers, in the winter: hence they should, early in the spring, be turned out into this grass, which will effectually cure the disorder.

DOG's-MERCURY, or *Mercurialis perennis*, L. an indigenous plant, growing under hedges and in woods, in many parts of Britain. Its perennial root creeps in the ground; the stalks are single, and

without branches, rising ten or twelve inches high, with rough leaves: these have their male flowers, growing in spikes upon plants different from those which produce seeds.

This vegetable is of a soporific and poisonous nature, both to man and brute. There are instances of persons who, by mistake, have eaten this plant like spinach, instead of *Chenopodium*, or English mercury, in consequence of which they never awaked from their mortal sleep. In the Isle of Skye, an infusion of it is sometimes taken to bring on a salivation.

Ray relates the case of a man, his wife, and three children, who experienced highly deleterious effects from eating this herb fried with bacon. Notwithstanding its hurtful properties, sheep and goats feed on it, but cows and horses refuse it.

When the dog's-mercury has accidentally been eaten among culinary plants, the most effectual method of procuring relief, is a brisk emetic speedily administered; and after having evacuated the contents of the stomach, vinegar, lemon-juice, or other vegetable acids ought to be taken in copious draughts. But, when the poison has been discovered only after the lapse of several hours, small doses of camphor may be given, till medical assistance can be procured.... See also Antidotes.

Lastly, the roots of the dog's-mercury afford, according to Bechstein, a blue and crimson colour, both in dyeing and painting.

DOG-ROSE, the Common; Wild-briar, or Hep-tree, *Rosa canina*, L. an indigenous plant, growing in woods and hedges: in the month of June it bears oval flowers, which are succeeded by red, egg-shaped berries.

The blossoms of this plant, when distilled, afford a pleasant perfumed water. The leaves of every species of the rose, but especially those of the dog-rose, are recommended as a substitute for tea: when dried and infused in boiling water, they yield a fine colour, a somewhat astringent taste, and a grateful odour....Dr. Gleditsch observes, that the green rose-leaves of every species are useful in currying fine leather.

An infusion of the full-blown blossoms of all the roses, especially of the paler kinds, is purgative; but the petals of red roses, gathered and dryed before they expand, become astringent. The bark of the dog-rose, according to M. Siefert, imparts to wool a dark brown colour, which was fixed in different specimens, by the usual ingredients; and on dropping into the dye a solution of alum, it changed into an azure blue. But he observes that, in all these experiments, the colours possessed little or no lustre.

The berries of this shrub are at present chiefly employed in Britain by the apothecary, for making the conserve of heps....On account of its fine flavour, the pulp of these berries, is likewise used by the housewife, in the north of Europe, for the preparation of domestic wines, with the addition of sugar. In a dried state, this pulp affords a grateful and rich ingredient in sauces. But we conceive that still greater advantage may be derived from dog-berries, by submitting them to the processes of fermentation and subsequent distillation. From an experiment we carefully made last autumn, it appeared that one gallon of this

fruit, without any admixture, but that of a little water, yielded about two pints of *first runnings*, which, after being distilled a second time, produced one pint of a very pure proof spirit.

DOG's-TAIL GRASS, the CRESTED, or *Cynosurus cristatus*, L. an indigenous perennial plant, which grows in dry pastures, on a moist clayey soil, and blows in July. Its leaves are shorter than those of any of the pasture grasses; but they grow closely together, in great abundance, and are very palatable to cattle, particularly to sheep....BECHSTEIN affirms, that the latter animals grow remarkably fat by pasturing on the different species of dog's-tail grass; and that their flesh thence acquires a flavour peculiarly delicate. Hence this plant might be advantageously reared in fields designed for sheep-walks, but by no means as a meadow or hay-grass. Its straws are uncommonly hard and tough; and, as they shoot up at a season when the leaves of all other grasses are very plentiful, they are not cropped by cattle, but generally suffered to stand and perfect their seeds, which afford a scanty subsistence to pigeons, at a time when their food is scarce.

2 C. *Echinatus*, L. Rough Dogs-tail grass, an indigenous plant, growing in moist, sandy, or clayey soils, in the island of Jersey, and at Sandwich, in Kent; flowering in the month of July: its stalk seldom exceeds the height of two feet. The mealy seeds of this vegetable may, in times of scarcity, be advantageously converted into *Bread*. BECHSTEIN remarks, that sheep feeding on the Dog's-tail-grass, as well as the other species of this plant, become remarkably fat; and the mutton is of a particularly fine flavour.

[3 C. *Indicus*, or Indian Dog's-tail grass, is a native of Pennsylvania.]

DOG'S-TONGUE....See HOUND'S-TONGUE.

DOG's VIOLET, or *Viola canina*, an indigenous perennial plant which thrives in shady places, heaths, and hedge-banks: it is in flower from April to June....Sheep are very fond of this herb, and bees collect honey from its blossoms.... The roots, when dried and pulverized, are said to be an excellent vermifuge, and were formerly drunk in wine, as an approved remedy for the colic. On account of their supposed astringent and restorative properties, they are sometimes given in water, to cure children of the epilepsy.

DOG-WHEAT: See DOG'S-GRASS. DOG-WOOD. See CORNEL.

[DOLICHOS, *Sinensis*. Chinese Dolichos bean was first introduced into this city since the American war, from seeds found in a tea-chest, but a surgeon in the American army afterwards brought some from the nations of hostile Indians, to Mr. Bartram, who heard from another person that this species was found native far interior in the western country.

The famous *Soy bean* is a species of *Dolichos*. See article SOY.]

DOLPHIN, or *Dolphinus phocaena*, L. a cetaceous fish, found in the German ocean, and also in the Mediterranean sea. It is covered with a smooth, but very tough and firm skin; its body is sometimes 8 feet long, and of a conical form, except its back, which is prominent. This fish has teeth in both jaws, and above its snout, or nose,

is a pipe, through which it spouts the water, necessarily taken in with its food.

Dolphins often follow ships at sea, and seize upon whatever is thrown overboard, as they are extremely swift in swimming, and are able to live a considerable time out of water; though, for want of air, they can continue in it only for a very short period. Hence they are sometimes taken up in fishing-nets, suffocated, by being forcibly kept under water.

These fish, when young, afford a palatable dish: they were formerly considered a great delicacy; but are now little valued, except for the oil, which they yield in common with other cetaceous fish.

DOOR, in architecture, is a contrivance for securing an aperture in a wall, to admit persons to enter and leave a house or apartment.

The proportions of doors are, in general, regulated by those of the human frame. In capacious buildings, they ought always to be larger than in small ones; but they should in none be less than $6\frac{1}{2}$ feet high, so as to allow a tall person to pass through it erect: the width must not be less than 3 feet.

Architects give the following dimensions for doors: in small edifices, their breadth ought to be 4 or $4\frac{1}{2}$ feet; in those of a middle size, 5 or 6; in large buildings 7 or 8: in chambers of the first description, $3\frac{3}{4}$, $4\frac{3}{4}$, or 4 feet; of the second, 4 or $4\frac{1}{2}$ feet; and of the third, 5 or 6; in churches, 7 or 8; and in gates 9, 10, or 12; by these proportions the height of doors may be easily determined; excepting those designed for the gates of cities, which should be only four-fifths of their breadth.

DOVE-COTE: See PIGEON-HOUSE.

DOUGH, is flour fermented with yeast, or leaven, and kneaded into paste.

In some parts of this country, the dough is made by the hand, but in the more populous towns and cities, the process is generally performed with the naked feet; a practice which deserves severe censure, as it may be easily avoided by the introduction of a certain machine, employed for the same purpose in the public baking-houses of Genoa. The object of this machine is, to convert a large quantity of flour into dough, and to knead it as completely as may be necessary, with a considerable saving of time and labour.

The machine consists of a frame or wall of wood, 14 palms (about $3\frac{1}{2}$ English feet) high, that supports an axis, 30 palms ($7\frac{1}{2}$ feet) long, and $1\frac{1}{3}$ palm (4 inches) thick; to which is joined a large wheel. In this wheel are steps, on which the men tread, turn it with great velocity, and thus impart motion to a cog-wheel that is fixed almost at the extremity of the axis, and acts upon various small pieces of machinery, or *beaters*, which communicate with a strong wooden tub, well hooped with iron. This tub will contain 18 *rubbi* of flour, which is carried to it in barrels, and mixed with leaven. As soon as the whole is tempered with a proper quantity of warm water, the wheel is turned round, by which the dough is expeditiously and completely kneaded. In general, a quarter of an hour is sufficient to make very good dough; but an experienced baker, who superintends the operation, determines whether it is to be continued for a few minutes, more or less, according to circumstances.

Those who think with us, that kneading the dough with naked feet, is a disgusting custom, and ought, without hesitation, to be abolished, will find a more copious description of the Italian machinery above mentioned, as well as a plate representing the whole apparatus, in the third volume of the *Repertory of the Arts and Manufactures*, [mentioned under article BREAD.] These improvements were sanctioned, and originally published, by the Patriotic Society of Milan, in their valuable *Transactions*; and we trust, that most of our bakers in the metropolis are sufficiently wealthy and intelligent to adopt the rational and *cleanly* practice here proposed.

DRAG, or WHEEL-DRAG, an implement so constructed as to prevent the accidents which frequently happen to horses, when drawing loaded carts down steep hills or declivities.

In the year 1794, an instrument of this description, upon an improved principle, was invented by Mr. JOSEPH KNEEBONE, of Marazion, Cornwall, for which the *Society for the Encouragement of Arts*, &c. in 1795, conferred on him a bounty of twenty guineas.

This simple contrivance is, on the brow of the hill, applied to the near wheel, being fastened to the shaft by a chain, to prevent the wheel from passing over it, in case any great obstacles should occur in the road. It answers the purpose of taking off the increased weight, necessarily thrown on the shaft-horse's back when descending any declivities, so effectually that the deep ruts, or loose stones, which frequently occur in roads, do not in any degree impede the descent of the cart. Instead of a loaded carriage running on the heels of the shaft-horse, when descending hills, the drag, by supporting and elevating the wheel, places it on a level, so as to oblige the horse to draw a small burthen. In some instances, it is even necessary to link the chain-horse to the side next the wheel that is dragged; by which means, a weak horse may, without any risk or danger, be placed within the shafts. As soon as the cart arrives at the bottom of the hill, the drag is to be taken off, and secured in the manner hereafter to be described.

Description of the cut of Mr. JOSEPH KNEEBONE'S *Wheel-drag, for two-wheeled Carriages.*

a, *a*, *a*, A piece of wrought iron, curved to the exact form of a cart-wheel, with the thickest part at *b*, on which the weight of the cart rests.

1, 2, 3, 4, are shoulders, that keep the wheel within the drag, and should be about 4 inches high. *c.* Is the wheel, made of solid iron, which is nearly as wide as the drag, 7 inches in diameter; runs on its axis at *d*; has a strong shoulder; and, as it projects, resists the sudden jolts of rough roads. *e*, Is the chain to be fastened to the near shaft, in order to keep the drag properly under the wheel, which, from being violently jerked, might be apt to pass over the drag and leave it behind: this is a necessary precaution, though seldom wanted, if the drag be well constructed.

In the shoulders marked 1, 2, are holes, by which the drag is suspended on hooks beneath the tail of the cart, when it is not employed.

This machine is, doubtless, susceptible of many improvements, especially in the size and construction of the wheel. By frequent use, the part to which the greatest pressure is applied, will necessarily wear away, and thus injure the drag: to prevent this accident, it ought to be shod, at first, with a plate of iron, or steel, fixed by means of two holes in its bottom; in which, when necessary, a similar piece may be inserted.

DRAGON'S-BLOOD, or *Sanguis Draconis*, is a gummy-resinous substance, imported from the East-Indies, either in oval drops, or in large grains resembling tears.

The genuine dragon's blood is obtained from the Common Dragon-tree, or the *Dracæna Draco*, L. It is of a dark-red colour, free from any external impurities; and, if reduced to powder, it presents an elegant bright crimson hue. Being inflammable, it readily melts in the fire, but is not acted upon by water. In a solid form, it has no sensible smell or taste; but, when dissolved in rectified spirit, it yields a slight degree of pungency, and a deep-red tinge. This drug is also soluble in expressed oils, to which it imparts a red shade, though less beautiful than that extracted from the ALKANET.

Dragon's-blood is principally employed for staining: but, being generally sold in an adulterated state, it should be remarked, that the best kind ought always to be of a granulated consistence; as the sort manufactured into small cakes, is of an inferior quality....In medicine, it is at present exploded.

DRAINING is the art or practice of making artificial channels, for carrying off superfluous moisture or water from wet or marshy lands.

This highly useful art did not generally engage the attention of agriculturists, till about the middle of last century. It was formerly practised by persons, called *undertakers*, who received one-third of the drained land as a recompense. The advantages to be derived from their labours being obvious, several public-spirited men of talents have lately, with considerable success, investigated the subject; and with great exertions, not only rendered the most boggy and unfruitful soils firm and stable, but in many in-

stances, so much improved their fertility, as to be productive of the finest grain.

Lands to be drained are usually divided into two classes: 1. *Uplands*, or those which are situated so high, that the water can descend from them, if properly collected and conducted; and, 2. *Fens, marshes*, or those lands which lie so low as to command no fall; have no descent; and some being even below the level of the sea.

1. With regard to *uplands*, it generally happens, that the waters from the springs beneath the soil are obstructed in their course to the neighbouring rivers. These springs originate from the atmospheric moisture; which, being condensed on the summits of hills into water, by the greater coldness of those parts, perforates the different strata of the incumbent soil, where it is of a porous nature; the water continues to descend, sometimes for many miles together, but generally from the nearest eminences into the adjoining valley, till its course is intercepted by a stratum of clay; where, being collected in considerable quantities, it is forced to work itself a passage through the porous strata of sand, gravel, or rock, that may be above the clay, following the course of these strata, till they approach the surface of the earth, or are interrupted by any obstacle, which causes the water to rise to the surface, and to form springs, bogs, marshes,, &c.

At the foot of hills, therefore, where the plain begins to be too moist, some augur-holes should be bored, in order to find the depth of the springs, and consequently the thickness of the upper stratum of the soil. If this be only 4 or 6 feet, an horizontal ditch should be cut along the bottom of the hill, to intercept the water, which ought to be carried off by one or more ditches communicating with the former, and conducting the water thus collected, into the neighbouring rivulet. Farther, as the strata, through which the water descends in forming these springs, have, with a few exceptions, the same inclination as the surface of the hill, the holes should be bored, and the ditch cut, not vertically downwards, as is commonly practised, but perpendicularly to that surface; a method which greatly facilitates the arriving at the second stratum: this will be more evident from the subjoined cut.

a, *b*, is the upper stratum, for instance, of marl; *c*, *d*, is the second stratum, of sand; *e*, *f*, represents the accumulated earth in the valley.

It is designed to shew, that, in boring holes through the upper stratum, in order to find that beneath it, they should be formed perpendicularly to the side of the mountain, and not perpendicularly to the horizon, as by the former method the hole *y*, *y*, is rendered much shorter than that marked *x*, *x*.

If, nevertheless, on cutting a ditch five or six feet deep, along the foot of a hill, vertically to the rising plain, the upper stratum be not penetrated, and consequently no water ooze into the bottom of the ditch, it will be expedient to bore other holes at the bed of such ditch, some yards deeper, or till water ascend through them. Where this succeeds, many holes should be made, and the water conducted into the adjacent brook, or river; for it will then rise, collect in those trenches six feet below the wet surface of the valley, and thus be carried off, instead of rising up from the lower *wall-springs*, or apertures of the stratum, through the incumbent soil, to the surface of the valley, which is so many feet higher.

This is the method which has been successfully practised, for several years, by Mr. ELKINGTON; but the *prior*, or at least *coeval*, discovery of which, is justly claimed by Dr. JAMES ANDERSON, who states (in the introduction of his ingenious "*Essays on Agriculture*," vol. iii.) that he sunk a hole with a wimble into the earth at the bottom of a ditch, in the year 1764; that the water rose six feet above the surface of the ground, and has continued flowing ever since, though with less rapidity.

These ditches should be made narrower as they descend, by spades of a proportionate size and breadth: but the lowest part ought to be contracted more than any other, so that the shoulders or edges of it may support stones or faggots, in order to cover the whole, at a small expence, without obstructing the currents of water. In many places, hollow-bricks, ridge-tiles, or old fragments of plastered floors, may be applied to the same purpose; as they may be substituted for stones, or faggots, and at a reduced expence.

Situations, however, frequently occur, where the first stratum of the earth may be too thick to be easily perforated; or where the water, condensed from the atmosphere on the summits of the hills, may work itself a passage between the second and third, or between the third and fourth strata, which form the sides of those hills, from a deficiency of so many of the strata at their summits. Hence the water lies too deep to be retarded in its progress by a ditch, or by boring; but, being dammed up by the materials that form the plain of the valley, it ascends through them to the surface, and thus forms boggy, or marshy ground. In such cases, the common mode of draining may be successfully employed: it consists in cutting several ditches four or six feet across the bog, or morass; and in covering them so that the water may not be obstructed in its passage, but be thus in part collected and conveyed away, though certainly with less advantage than where springs can be intercepted.

Another method of draining is, that of opening trenches, or drains, almost annually, by a large plough with two converging coulters, and other appropriate machinery, for the purpose of cutting both sides of

a ditch at the same time, and turning out the intervening soil...... These large ploughs are still kept in some parishes, and drawn over moist commons, by twelve or twenty horses, so as to form parallel ditches.

An instrument was invented for this purpose by Mr. ADAM SCOTT, of Guildford, Surrey, called by him, a *mole-plough*, and for which the *Society for the Encouragement of Arts, &c.* in 1797, gave him a bounty of thirty guineas. It consists of a coulter, 15 inches in length, and 2 ½ in width, to cut the sward. Behind this is applied an horizontal cone of cast iron, 20 inches long, and 2 ½ in diameter at the base, to the middle of which is fixed an upright bar 2 feet long, and 3 ½ inches broad, with a sharp edge. If this cone be drawn along moist lands, 6 or 8 inches beneath the turf, either in the spring or in autumn, in several parallel directions, the water will be conveyed away for a considerable space of time, without breaking the surface. With Mr. SCOTT's mole-plough, a man and boy with four horses may, with ease, drain thirty acres in a day; but, at the lower side of the ground intended to be drained, there should be made an open gripe or ditch, in order to receive the water from those small cavities which are formed by the plough, at the depth of 12 or 14 inches. In very moist lands, or in very wet seasons, if a larger number than six or eight horses be employed, their feet will not sink so deeply into the turf, as each animal will draw less; should, however, the ground be so exceedingly soft as scarcely to support the cattle, that inconvenience may be obviated by fixing to the horse's feet broad wooden shoes, similar to the snow shoes made use of by the inhabitants of northern climates. The price of this useful plough, when complete, does not exceed two guineas and a half.

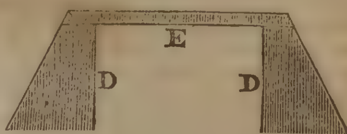
In October, 1797, a patent was granted to Mr. HARRY WATTS, of Binley, Warwick, for his invention of an implement, or machine, for draining land, which appears to be an improvement on Mr. SCOTT's mole-plough. The only material difference which subsists between them, is Mr. WATT's application of a rolling cutter made of cast steel, or cast iron, in the beam of his implement, instead of the common coulter, which, in Mr. SCOTT's plough, is fastened in the usual manner, by wedges. The patentee has likewise added three cutters, which may occasionally be substituted for the rolling cutter or coulter above mentioned. This implement requires from four to eight horses, which number may be increased or diminished, according to the nature of the land, and the depth it is intended to be worked. But, before it is used, M. WATTS observes, that the land to be drained should be carefully examined, in order to ascertain the most convenient place for carrying off the water: hence the lowest end or side of the field must be selected for that purpose. The price of Mr. WATT's machine, we understand, is not less than ten guineas.

The last method of draining uplands, of which we shall give an account, is that practised in the county of Berks. It consists in digging a trench 2 feet deep, one foot wide at the top, and 9 inches at the bottom, with a steep descent

to a ditch, extending along the bottom of the grounds, and made of a proper width and depth to receive and carry off the water....... Within these trenches, is formed a channel, the sides of which are composed of hard white chalk, cut nearly into the size of bricks; the whole is covered with pieces of the same material, and the crevices filled up with the chippings. The mouth of the channel, where the water falls into the ditch, is constructed with brick or flint, as chalk will not bear the frost, to which this part of the work must necessarily be exposed. On the top of the channel is placed a thin coat of wheat-straw, brambles, or any small brush-wood. The passage for the water will be somewhat more than 3 inches. In digging trenches of this kind, the workmen lay the best earth on one side by itself, in order to replace it on the surface when the trenches are again filled up. But, in all cases, where land lies on a declivity, care should be taken, that the drains have an easy and gentle descent, for, if they have too rapid a fall, they are apt to burst, or excavate; and, their protection below being lost, the least pressure from above will consequently destroy the work.

II. With respect to the draining of those *plains* or *morasses*, where no fall can be procured, the water may, in many situations, be collected by cutting a long horizontal ditch above the level of the morass, so as to intercept all the wall-springs; and may then be carried off in wooden troughs, or hollow bricks, above the surface; and, if any water continue to penetrate the morass, it may be conducted to the extremity of the ground, either in open drains, or in covered brick drains, of which we have annexed the following cuts:

This figure represents a hollow brick, two of which, being placed one upon the other, form the pipe, which is chiefly useful for making small drains.



D, D, are two bricks placed opposite each other, and then covered with E, a stone on the top, in which situation they will form a large drain....The mould pressing on the sides of the bricks, keeps them firm and steady: the turf taken-off the soil, ought to be laid upon the stone, with the grass side downwards.

The draining of low moist lands may also be advantageously effected by a *roller* or *wheel*. This is made of cast-iron, weighs 4cwt. and is 4 feet in diameter: The cutting edge, or extreme circumference of the wheel, is half an inch thick, which, increasing in thickness towards the nave or centre, will cut a drain half an inch in width at the bottom, 4 inches wide at the top, and about 15 inches deep. This wheel is so placed in a frame, that it may be loaded at pleasure, in order to score out a greater or less depth, according to the resistance of the ground; which being thus cut during the winter, the wheel tracts are either then filled with straw ropes, and lightly covered

over, or left to crack wider and deeper, during the succeeding summer; when the fissures should be kept open with twisted straw and bushes, and lightly covered with such porous soil as can be most conveniently procured. Thus hollow drains may be formed upon grass or ley-land, at little expence, and will answer every useful purpose.

The necessity and utility of draining the surface-water from *clay soils*, in wet seasons, is generally acknowledged; but, excellent as the different methods are in the cases before mentioned, they do not appear to be so simple, or so effectual, as could be wished in the present. Covered drains frequently fail in producing the desired effect, in consequence of the covering materials being of too close a texture to admit the water to filtrate through them with sufficient freedom. Mole-ploughs, of the best construction, require such a number of horses to draw them, as must necessarily injure the soil, by *poaching* it. Farther, *covered drains* are not only dangerous to full-grown sheep and young lambs, but from the quantity of clay necessarily dug up, and spread over the richer surface-soil, they are also injurious to vegetation. None of the several modes of draining now in use, being subservient to the essential purpose of conducting large quantities of water from a deep soil, we feel satisfaction in communicating the following simple contrivance of Mr. John Middleton, just published in the 22d No. of the "*Commercial and Agricultural Magazine*." It consists merely in adding a piece of wood to the felly of a common six-inch cart-wheel, to which is prefixed a rim of iron, of a triangular form. The whole expence of this addition does not exceed one guinea. A wheel of this description, when put on the axle of a cart in the usual way, will of course rest on the edge of the triangular rim of iron above alluded to; and, on driving the horses forward, will make a small indent in the ground, merely by its own revolution. But, in order to press it down to the depth of six or eight inches, that side of the cart should be laden with stones, iron, or any other heavy material, until the whole of the rim, as well as the additional piece of wood, and the felly itself, if necessary, sink into the soil. The cart should then be drawn in such a direction that the cutting-wheel may revolve where the drains are intended to be formed. Sometimes it will be necessary to apply the indenting machine to every furrow; but, where the land is level, it should be drawn over it in parallel lines, five or ten yards apart. The wheel on the opposite end of the axle is a common six-inch wheel, which supports only the empty side of the cart, and consequently will not cut the ground.

The advantage of this contrivance, as stated by Mr. Middleton, is, that it makes an indent in the soil sufficient to carry off the water during the ensuing winter, by pressing down the herbage, without destroying it. In the succeeding spring, these drains will be nearly grown up, so that there is no injury done to the grass. He observes, however, that this wheel should be drawn over the ground every year, on the approach of winter; but so easy is its application, that by means of it, and two old horses, one stout boy, or man,

may drain from *ten* to *twenty* acres in *eight* hours.

The first object in draining a bog or marsh, is, to discover the lowest spot of dry ground that surrounds it, in order to open on that part the main trench which is to carry off the water: if there be the least appearance of any stream, it should be traced with care; for this will point out the proper spot on which to begin. The main trench, commencing at the lowest part, may be carried to whatever distance it is thought proper; if it begin at the right spot, 10 acres may be detached from the marsh, however extensive, and completely drained; but, if the drainage be not begun where there is a sufficient fall, the labour bestowed will be to no purpose: the main cut or trench should be 10 feet broad in the clear, with a proper slope, to prevent the sides from falling in, and filling it up.

Bogs are divided into two sorts, *black* and *red*.....The former are solid, and make excellent fuel for common fires, or for burning lime; but the red bog consists of a loose, porous, fungous mass, which burns badly, and yields no ashes. Hence, in black bogs only, the drains ought to be cut into turfs, dried, carted, and piled.

As the main canal advances, small ones may be conducted into it on either side, inclosing such spots of ground as are intended to be improved. No certain rule can be laid down for the depth of drains; yet we apprehend the prevailing practice of cutting them down to the solid ground beneath the bog, is founded on the erroneous principle, that such depth is sufficient as will leave the surface dry. Numerous drains, however, being always useful and necessary, the spots inclosed ought not to contain more than five acres; but in such space it is requisite that several cross-cuts be made, which should be 4 feet broad at the top, and 3 feet deep. A whole year will be requisite to complete these drains; and, in the ensuing spring, it will be necessary to open, deepen, and clear them of the adventitious boggy matter; a work which should be occasionally renewed. The second year may be employed in extending the main trench; in taking in fresh inclosures by new lateral cuts; and in draining these by means of small transverse drains. Although this annual deepening and clearing of marshy grounds be attended with great labour and expence, yet the operation is thus progressively completed, and in succeeding years both trouble and costs will be gradually diminished, in proportion as the bog subsides.

As soon as the drains have rendered the marshes sufficiently firm for oxen to walk on them, the heaviest rollers that can be procured should be employed, to act by repeated pressure. Indeed, without a considerable degree of such pressure, during the first year, no bog can be effectually consolidated. An alternate draining and rolling, annually (the drains being still kept open), would, probably, contribute much to the destruction of weeds. Previous to rolling in the spring, it has been strongly recommended to sow every kind of grass-seeds, indiscriminately, such as ray-grass, hay-seed, clover, &c.

An instance of uncommon and successful industry occurs in the 18th vol. of the "*Transactions of the Society for the Encouragement of Arts*," &c. which in the year 1800, conferred a gold medal on JOHN MOREHOUSE, Esq. of Brown,

slade, in the country of Pembroke, for improving 274 acres of waste moor-lands, which were formerly a common, and so completely inundated as to be of no value whatever.

Before we conclude this subject, we think it necessary to give some account of *stone drains*, which are calculated for soils where the common methods of draining cannot be adopted. Such drains ought to be cut 10 or 12 inches wide, with perpendicular sides; and flat stones should be so placed, as to leave a water-course at the bottom, by setting two stones triangularly to meet at the points. Or, the bottom may be covered with a flat stone, and three others placed upright, and the water left to work itself a passage between them. In either case, the cavity of the drain ought to be filled nearly up to the top with loose stones: screened or washed gravel, where it is found in greater abundance, has been successfully substituted. Those pebbles, however, which are often found on the sea-shores, are well adapted for filling drains; as, being smooth, and generally round, the water flows through them more freely.

The principal drains ought to be 3 feet deep, and 18 inches in width; the bottom and top should be laid with flag-stones; the sides built up to a sufficient height with common stones; and the whole covered with sods of turf, but the grassy sides downwards: these again are to be overspread with earth, sufficient to admit the plough. The smaller drains are, in general, to be conducted at an acute angle into the main trenches.

Lastly, *sod* or *earth-drains* are usually dug two feet deep with a spade, when the soil is taken out by an instrument, or scoop, about four inches wide, and the drain covered with the sods first dug out, if the ground be firm enough to support them; or, some black-thorns are put in, in order to bear the weight of the sods. Those drains which have the smallest passage for the water at the bottom, are reputed to be the most durable; as the force of the water has been found sufficient to clear away any small obstacles accidentally obstructing its course.

Common earth-drains are sometimes dug two or three spits deep, with a broad spade, the bottom is taken out with a narrow one, and filled with stones.....Sometimes a furrow is drawn with a plough, and cleared by a common spade: the draining instrument *Fig.* 1, is then introduced to the depth of 18 inches from the surface; and, after taking out the loose mould with the scoop *Fig.* 2,

black-thorn bushes, or heath, which is still better, are carefully laid along the bottom, covered with strong wheat-straw, twisted to the thickness of a man's leg; and the whole is then carefully closed in.

Hollow drains, without stones, have been tried on stiff lands: they are made narrow at the bottom, and covered half way up with sods or square pieces of the surface-sward, resting on ledges cut for that purpose.

It is much to be lamented, that we possess, in this cold climate, no grain similar to *rice*, that would grow in watery grounds, which cannot be drained, nor indeed any esculent roots or foliage, except water-cresses. In such situations, some plants may perhaps be cultivated with profit to the proprietor, as the *Festuca fluitans*, or Floating Fescue; *Callitriche*, or Star-grass, or Star-wort; to which may be added the *Orchis*, for the purpose of making salep, by drying the peeled roots in an oven. If these plants should not completely succeed, other vegetables of quick growth may be raised for manures, such as the *Typha*, or Cat's-tail; the *Caltha*, or Marsh-marigold, &c. which should be mown twice a year, while they are young, and abound with saccharine and mucilaginous matter, ready to pass into fermentation.

A peculiar method of draining land with *chalk*, as a substitute for stones, has lately been practised in Yorkshire, with considerable success. It consists merely in cutting the trenches in the usual manner, and filling them with pieces of chalk; over which is laid a thick stratum of evergreen-boughs, that are covered with the sod or earth. The extremities of the main drains are arched to a short distance with brick-work: because the frost is apt to pulverize the chalk, and consequently the drain will be injured....The principal advantage thence derived is, that *no moss will grow on the chalk*, whereas stone-drains are frequently obstructed by its growth: hence we are induced to recommend draining with chalk, to the attention of those farmers who have an opportunity of procuring that article, at a moderate expence.

In the year 1792, the *Society for the Encouragement of Arts*, &c. awarded their silver medal to Mr. John Wedge, for his exertions in draining land. The limits of this article not permitting us to analyze Mr. W's valuable communication, which is inserted in the 10th vol. of the Society's "*Transactions*," &c. we shall only observe, that the chief advantage consists in *boring*, or digging holes below the bottom of the trench; a practice, which, in some instances, is attended with the most beneficial effects; though it is not absolutely necessary, in ordinary cases.

A short but interesting "*Sketch of the Drainage and Improvement of a Marsh*," in the county of Cornwall, by Mr. Richard Moyle, occurs in the 2d vol. of "*Communications to the Board of Agriculture*." The bog contained 36 statute acres, which had from time immemorial been covered two or three feet deep with water; and which, during spring-tides, were overflowed by the sea, from a river taking its course through the land. As the low situation of the marsh rendered it impracticable to drain the bog by the aid of such river, recourse was had to a wooden pipe, furnished with valves, and connected with

the shore at the part called *Half-ebb*. This expedient was attended with complete success: the soil was pared and burnt; large quantities of clay and other manure were carted; and, after persevering in these exertions for five years, the whole of the land was "quite alive;" so that every kind of vegetables flourished with great luxuriance....For a more detailed account of this remarkable improvement, the reader will consult the work above quoted.

In the 19th vol. of the "*Transactions of the Society for the Encouragement of Arts*," &c. we meet with a description of a Drain-plough, constructed according to the plan of the patriotic Duke of Bridgewater; and of which the annexed plate and following description will convey an accurate idea.

A, B, is the beam of the plough.

C, D, are the handles.

E, the share, or sock.

F, the coulter, or first cutter of the sod, which is fixed to the share.

G, is the other coulter, or second cutter, which separates the sod from the land, and forwards it through the open space between F and G....This coulter is connected both with the share and with the beam.

H, I, the sheath of the plough.

K, the bridle or muzzle, to which the *swingle-tree* is fitted.

L, M, are two cast-iron wheels, that may be raised or lowered by screws at N, pressing on the flat irons O, O; to which the axis of each wheel is fastened. These wheels regulate the depth, to which the share is designed to penetrate the soil.

P, is a chain with an iron pin, for moving the screws at O.

Six horses will be necessary to draw this plough, in clay-soils which have never been drained; every succeeding year, the implement must be drawn through the same gutters; when four horses will be sufficient.....In stiff, *flat* lands, this drain-plough cannot cut the ground too deeply; but, if it be employed on a declivity, five inches will, in general, be a sufficient depth. In soft, light soils, however, the plough should be directed as deep as possible; because the sides are apt to crumble into the gutters....The best time for draining land is in autumn, about Michaelmas; or immediately after the grass is eaten off; and the whole operation ought to be completed between that season and Christmas.

It frequently happens that, notwithstanding all the labour and expence which the industrious cultivator may bestow on the construction of drains, his lands become, in the course of time, soft and wet, so that they gradually return to their former state. This unfavourable change is often occasioned by the *Equisetum palustre*, or Marsh Horse-tail, a plant growing on swampy ground, which has been found vegetating *within* the drains, to a very considerable extent, and thus, at first intercepting or obstructing the course of the water, then gradually weakening the current, and at length, wholly choaking up this drain.

[Sir Joseph Banks has communicated to the *Board of Agriculture* the following remarks on the effects of the above plant on drains.

At the Duke of Bedford's seat, at Wooburn, some bogs drained by under-drains, made at great expence, appeared at first perfectly dry, but have since been found to grow

by degrees less so. On examination, these drains were found more or less cheaked by a plant vegetating within them, and forming both stems and roots, the whole several yards in length, intercepting the course of the water, weakening the current by degrees, and at last, wholly choaking up the drain. This plant is the *equisetum palustre*, a weed common in moorish and swampy ground, but little noticed by naturalists. Its root, or rather its stem under ground, is a yard or more in length, and in size, like pack-thread: from this, a root of twice the size of the stem runs horizontally in the ground, taking its origin from a lower root, which strikes downward perpendicularly to a depth Sir J. says, (which he has been able to trace) as thick as a small finger. This root forms in some places, beds which occupy a large portion of the more solid parts of a peaty bog, as may be seen in some parts of the banks of the Duke's open drains. As the bud, by which the plant appears to renew itself in spring, is situated on the horizontal root, a yard or more in depth, the shoot must in its progress upwards, be liable to meet with under-drains, and penetrate into them, through the openings left for the passage of the water. When once entered, nature has given the plant powers of piercing the soil upwards, and to enable it to live in the atmosphere of a drain. The evil, if known, Sir JOSEPH thinks, may be cured by casting the under drains into open ones.]

Those who wish to acquire more minute information on this subject, we must refer to Dr. ANDERSON'S excellent "*Practical Treatise on draining bogs and swampy grounds*," (8vo. pp. 308, 6s. boards. Robinsons, 1797): and to Mr. JOHNSTONE'S "*Account of the most approved Mode of Draining Land*," &c. (4to. 1*l.* 5s.) in which it is amply investigated....See also PONDS, with a plate.

DRANK. See DARNEL.

DRAUGHT, in trade, is a small allowance on all goods capable of being weighed, and which is made by the king to the importer, or by the seller to the buyer, so that the weight may not be deficient, when the goods are weighed again. Thus the king allows one pound draught for goods, that weigh not less than 1 cwt.; 2 lbs. for such as weigh between 1 and 2 cwt.; 3 lbs. for those that weigh between 2 and 3 cwt; 4 lbs. from 3 to 10 cwt.; 7 lbs. from 10 to 18 cwt., 9 lbs. from 18 to 30 cwt. and upwards.

DRAUGHT, or *Draft*, is also sometimes used, for a bill of exchange, but generally for an order on a banker, or trader, for the payment of any sum of money that may be due, &c.; in which case, the person who gives the order is said to *draw* upon the other.

DRAUGHT, in Rural Economy: See HORSE.

DRAWBACK, in commerce, generally signifies certain duties, either of the customs, or excise, which are allowed upon some of our own manufactures; or upon certain foreign merchandize, for which the duty has been paid when they were imported.

[DRAWING, though a domestic employment, and well worth attending to, yet cannot be acquired by any directions which could be given in a work like the present. A preceptor is indispensible. A

very convenient machine to draw perspectives, shall be described and figured under the article PERSPECTIVE.]

DRAW-NET, a kind of net for taking the larger species of wild fowl: it ought to be made of the best pack thread, with wide meshes; the whole should be about two fathoms in depth, and six in length; verged on either side with a very strong cord, and stretched at each end on long poles.

Draw-nets must be spread smooth and flat on the ground, and strewed over with sedge, grass, &c. to conceal them from the fowl. The sportsman should likewise conceal himself in an arbour covered with the boughs of trees, grass, fern, or other vegetables, in order to prevent his being discovered: See also BIRD-CATCHING.

DRILLING, in husbandry, a method of sowing grain or seed of any kind, so that it may be deposited in the ground at an uniform depth; a circumstance of the utmost importance to the production of healthy and vigorous plants.

This method differs from the old, or broad-cast husbandry, which is performed by sowing the grain, or seed, with the hand; whereas the new practice is effected by one of the most useful machines ever invented, and called a *drill-plough*.... It was originally introduced into this country about sixty years since, and at first violently opposed as an useless innovation, till it was proved, by repeated experiments, to be indisputably the best mode of sowing hitherto contrived. See BROAD-CAST.

By the broad-cast system of culture, the land is often sown in bad tilth, the seed is always scattered at random, and sometimes by very unskilful hands. In drilling, the ground must be in good order; and the seed set in trenches regularly drawn, all being nearly of an equal depth, which is adapted to the nature of each particular kind of seed. These seeds are also distributed at proper distances; and, by being equally and speedily covered, are most effectually protected from vermin, and other accidental injury. Farther, in consequence of the broad-cast practice, the seed falls in many places too thick, in others too thin; and, being imperfectly covered, part of it is devoured by vermin which follow the sower; the remainder is exposed to rain or frost, or to heats, either of which are very hurtful. When harrowed in, a considerable portion of the seed is so deeply buried in the soil, that if the latter be wet, it putrifies before it can vegetate.

Besides, when corn is thus sown, the crop will not admit of being touched afterwards, because its growth is irregular. The soil cannot be broken in order to afford it more nourishment; nor can even the weeds be destroyed without much damage and inconvenience. On the contrary, in the drill-husbandry, the intervals between the rows, whether double or single, may be horse-hoed; and nourishment may thus be repeatedly given to the plants, and the weeds almost totally extirpated. Drilling, however, is not calculated for *every* soil; yet as there are but few situations, in which the broad-cast method is preferable to it, they ought not by any means to impede the more general introduction of the former.

The drill-husbandry is said to be attended with many disadvantages: namely, 1. That it is very difficult

to procure the persons who are acquainted with the use of the drill-plough, or its proper management, when on the soil. 2. That the earth requires to be well prepared to admit of it. 3. That the crop is too thinly sown by it. 4. That drilled crops are harvested later than broad-cast ones. 5. That clover does not succeed, when cultivated according to the drill-husbandry. 6. That oats produce rank and coarse straw, which does not afford wholesome food for cattle.

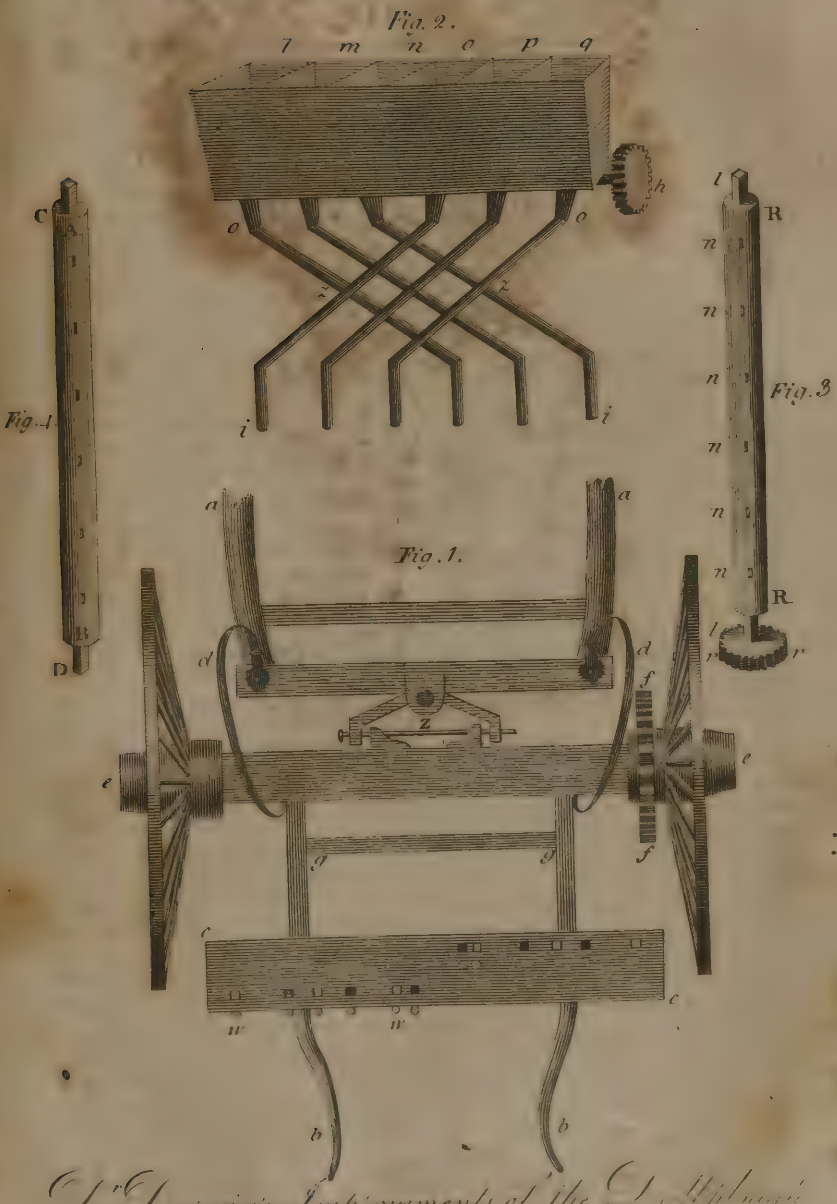
These objections appear formidable, and it must be allowed, that no person can acquire a thorough knowledge of the drill-husbandry in one season. It is nevertheless untrue, that the seed is too thinly sown; for, though the quantity required is nearly one half less (which is consequently saved), yet the crops of drilled wheat are, in general, so much more valuable than those of broad-cast, whether we consider the quantity, quality, or weight of the grain, that the inferiority of the latter is evident to every impartial observer. This reason is likewise a sufficient answer to the objection alledged against the expence of horse-hoeing, which eradicates almost every weed, even where hand-hoeing is impracticable; and consequently in a very considerable degree promotes vegetation.

To this, we may add, that by drilling, the seed grows more regularly and vigorously; and that though the crops are harvested later than broad-cast ones, yet they are *gotten in* with less expence, and with greater safety, while the soil is left in a better state for future crops.

Such are the advantages and disadvantages attending the drill-husbandry, which we have endeavoured fairly to state: after these decisive proofs, no rational agriculturist will hesitate to pronounce in favour of the new system.

That useful instrument the *drill-plough*, was first introduced in this country by the ingenious Jethro Tull, in the beginning of the last century. Since that period, various other machines, or drill-ploughs, have been invented by different persons, of which we shall mention the principal.

One of the earliest implements of this description, is the *hand-drill*, which is chiefly employed in the low-lands of Scotland, where it was also invented. It is pushed along by two handles, in a manner similar to wheel-barrows, and sows one row at a time. The principal part of this machine is a wheel, about 22 inches in diameter, and made of solid deal, upon the axle of which is fixed a notched roller $2\frac{3}{4}$ inches in diameter, and 2 inches long, that turns in the fore part of the drill-box. The quantity of seed intended to be sown, is regulated by a slider, which moves up and down in the fore-part of the box, by an adjusting screw fixed at the top; and has a strong brush, that projects from its lower end, and sweeps upon the notched roller.... There is also a sluice, or slider, which lies flat on the bottom, on the inside of the drill-box, and juts out between the two handles of the drill, so as to be within the reach of the person guiding it; who, by pushing the slide forwards, completely covers the notched roller, and prevents any of the seed from being scattered, while the drill is turning at the end of the ridges.... With this implement a woman, or boy, is able to drill from 2 to $2\frac{1}{2}$



Dr. Darwin's Improvements of the Drill-plough

acres in a day: the rows being at the distance of 20 inches.

The next contrivance, is that of the ingenious Mr. ARTHUR YOUNG, whose indefatigable labours in promoting agriculture, are too well known to require our encomium. In the common drill-ploughs, there are generally two or three barrels, with corresponding hoppers, or receptacles for seed, through which it is committed to the ground. Such an arrangement renders them necessarily complex; and to obviate the defect resulting from it, Mr. YOUNG has two divisions in the barrel, and two corresponding ones in the hopper, which are more simple, and doubtless preferable to moveable boards. In his drill-plough the whole machinery is fixed, yet he sows with it single rows at any distance, double ones at two feet, or three rows at one foot; relinquishing the other powers of mechanism, to render the plough in all its parts stronger, and more steady. It is likewise calculated for the stiffest soil; and Mr. YOUNG adds, that it will even deposit seed in drills cut through a clay field, without any previous ploughing.... For a more detailed account of this excellent machine, we refer our readers to the 3d vol. of "*Annals of Agriculture*," p. 240, where it is fully described and illustrated with an engraving. The expence of this implement, when complete, is about seven guineas and a half, if made of iron; if of wood, it may be estimated at four.

[Dr. WILLICH describes and represents the Rev. Mr. COOKE's drill machinery, but acknowledges that it is too complicated. It was intended to sow wheat, but the editor has been informed that it is but little used, even in England, where it was invented. In this country, it certainly would not be used. A model of the ponderous machine, was imported some years since, by the *Agricultural Society of Philadelphia*, and no doubt, is still to be found.

Under the article TURNIP, a convenient and very simple drill will be described, which may be used for any kind of seeds, by merely changing the seed box.]

Description of the Plates representing Dr. Darwin's improvement of the Drill-plough.

Plate I. *Fig.* 1, *a*, *a*, are the shafts for the horse, fixed to the centre of the axle tree, by a simple universal joint at *z*, from which, if the horse move in an oblique course, either spontaneously, or designedly, to avoid trampling the rows of corn, in hoeing, the person guiding the plough behind, may keep the coulters in any direction at pleasure: *b*, *b*, are shafts or handles behind, for the man who attends the drill coulters or hoes: these handles are applied to the axle-tree before, and have a transverse piece about 6 inches from the latter at *g*, *g*, in order to support the seed-box (Fig. 2.)....At the distance of about one foot behind this, there is another cross piece at *c*, *c*, called the coulter-beam, which is about 4 feet 2 inches long, 6 inches wide, and 2 inches thick: it is perforated with 2 sets of square holes, each set consisting of six, to receive the coulters in drill ploughing, and the hoes in horse hoeing.

The light square holes are 9 inches distant, and are designed to receive the coulters, or hoes in the cultivation of wheat, the rows of

which are to be 9 inches apart: the six dark square holes are 7 inches from each other, for the reception of the coulters or hoes in the cultivation of barley, the rows of which are to be at the distance of only 7 inches. This coulter-beam has likewise 6 circular holes at one end, and 6 round iron staples fixed into the edge of the other part of it: into these are inserted the ends of the tin flues, which intersect each other, and convey the seed from the bottom of the box into the drills or furrows, when the coulters are properly arranged in the square holes. The person guiding the machine can raise these coulters, or hoes, out of the ground, when passing to or from the field, or in turning at the end of the land; and may thus suspend them on the iron springs *d*, *d*, which, at the same time fix the shafts to the axletree, so that the wheels will follow in a similar direction with the horse.... *e*, *e*, are wheels, four feet in diameter; upon the nave of one of which is a cast-iron wheel at *f*, *f*, to turn the axis of the seed-box, which has a similar wheel, but only one-fourth of its diameter, so that the axis of the seed-box revolves four times to one revolution of the wheel.

Fig. 2, is the seed-box, consisting of boards about 1 inch thick, 48 inches in length within, 12 in depth, of a similar width at the top, and 6 inches wide at the bottom. It is divided into six compartments for the reception of grain, and ought to have a cover with hinges, to exclude the rain. This box is to be placed partly over, and partly before the axle-tree of the machine, as delineated at *g*, *g*, in Fig. 1. Beneath the seed-box passes a wooden cylinder at *h*, *h*, the circumference of which is excavated for the reception of grain from the six cells marked *l*, *m*, *n*, *o*, *p*, *q*; and for conveying it to the six oblique tin flues, *i*, *i*, which intersect each other, as represented in Plate I. Fig. 2. By this reciprocal crossing, the seed-flues are designed to increase the length of the inclined surface on which the seed descends, in order that, if six or eight grains be delivered at the same time, they may so separate by their friction, when descending, that they cannot be sown together on the same spot, which might occasion tussocks of corn.

As these seed-flues intersect each other before they pass through the coulter-beam at *c*, *c*, (Plate I. Fig. 1), it became necessary to make 3 of the circular holes, at one end of the coulter-beam, more backward than those at the other; and, therefore to use iron staples or rings at one end, instead of perforations, as at *w*, *w*, (Fig. 1.) These tin flues deliver the seed into the small furrows, or drills, which are made by the coulters before them. The seed-flues have a joint at *z*, *z*, where one part of the tin tubes slides into the other part, by which means the former can be occasionally shortened or lengthened, in order to adapt them to the coulters, when placed 7 inches apart, for sowing barley; or, at the distance of 9 inches, for sowing wheat. In the bottom of this seed-box are 6 holes, one in each compartment, for conveying the corn into the excavations of the cylinder, revolving beneath them. These holes are provided, on the descending side, as the cylinder revolves, with a strong brush of bristles, about $\frac{3}{4}$ of an inch in length, which press hard on the tin cylinder. The holes

in the bottom of the seed-box, on the ascending side of the revolving cylinder, are furnished with a piece of strong leather (such as is used for the soles of shoes,) which rubs upon that side of the cylinder; by which means the corn, of whatever kind, is exactly delivered, while the axis is revolving, without a single grain being cut, or bruised.

Fig. 3, is the iron axis, and wooden cylinder beneath the seed-box. An iron bar is first made, about 4 feet 6 inches long, and 1 inch square, the weight of which ought to be about 15lbs. it is covered with wood, so as to form a cylinder 4 feet in length, and 2 inches in diameter, represented at *r*, *r*, in this figure. The use of the iron bar in the centre of the wood, is to prevent it from warping, a circumstance of great importance. This wooden cylinder passes beneath the seed-box, and has a cast-iron cog-wheel at one end of its axis, as at *r*, *r*, which is one-fourth of the diameter of the correspondent cast-iron wheel, fixed on the nave of the carriage-wheel, as in Fig. 1, *f*, *f*, so that the axis of the seed-box revolves 4 times during one revolution of the carriage wheels.

In the circumference of this wooden cylinder are excavated four lines of holes, consisting of six in each line, as at *n*, *n*, *n*, *n*, *n*, *n*. A similar line of excavations is made opposite to these, on the other side of the cylinder, and between these are two other rows of holes, amounting in the whole to twenty-four excavations in the wooden part of the axis beneath the seed-box, for the purpose of receiving and conveying the corn from the seed-cells into the flues *o*, *o*, *i*, *i*, (Fig. 2), while the axis is revolving: in which respect this improvement of Dr. Darwin bears some analogy to the original design of the celebrated Mr. Tull.

These excavations are one inch in length, half an inch in width, and three-eighths of an inch in depth, which dimensions are too large for any seeds employed at present in large quantities, except beans; but but which may be contracted to any dimensions required, by moving the cylinder over the wooden one, as will be immediately explained.

Fig. 4, A, B, represents a tin cylinder one inch longer within, than the wooden cylinder on the iron axis at Fig. 3: it is 2 inches in diameter within, so as exactly to fit the wooden cylinder, which may slide within it about an inch backwards or forwards....C, D, are two square sockets of tin, fixed on the ends of the tin cylinder to fit on the square part of the iron axis, passing through the wooden cylinder at *l*, *l*, Fig. 3, on which they slide one inch, as before.

The following directions for perforating the holes, both in the tin and wooden cylinders, which are mutually to correspond, Dr. Darwin recommends to be strictly attended to.

1. When the tin cylinder is soldered longitudinally, and one end of it is thus fixed, as at A, six holes ought to be made through it, lengthwise, on its four opposite sides; each hole must be exactly one half of an inch in width, and 5-8ths of an inch in length, which should be parallel to that of the cylinder. The centre of the first of these holes ought to be five inches distant from the closed end A; and that of the second hole, eight inches apart from the centre of the first; and the others in the same propor-

tion, till six holes are made longitudinally along the cylinder. Another line of six similar holes is then to be made on the opposite side of the cylinder; and after that, two other such lines between the former; the number of holes amounting in the whole to 24, the dimensions of all which should be exactly observed, as well as their distances.

2. The wooden cylinder, fixed on the axis, is now to be introduced into that of tin, so as to leave the exact space of one inch void, at the closed end A; when the size of all these apertures through the tin cylinder (each of which is exactly half an inch in width, and 5-eighths of an inch in length,) should be carefully marked with a fine point on the wooden cylinder, which ought not to be previously excavated.

3. The 24 holes, thus marked on the wooden cylinder, are now to be excavated precisely 3-eighths of an inch in depth, to which are to be added 3-eighths of an inch at that end of each them which is nearest to A; so that, when the wooden cylinder is again replaced in the tin cylinder as before, with one inch of void space at its closed extremity, the excavations in the former will be 3-eighths of an inch longer than the perforations over them in the latter. These excavations in the wooden cylinder should, likewise, be somewhat narrower at the bottom, effectually to prevent any of the grain from sticking in them, while revolving.

4. An iron screw, about three inches in length, with a square head for the reception of a screw-driver, should be passed through the end A, of the tin cylinder on one side of the axis, as at C, in Fig. 4. The screwing part of this must lie in a hollow groove of the wooden cylinder, and be received into a nut, or female screw, fixed to the same cylinder. The head of the screw, passing through the end A, of the tin cylinder at C, should have a shoulder within the tin cylinder, to prevent it from penetrating through the end of it. A brasss ring should also be put over the square end of the screw, on the outside of the tin cylinder, through which end a pin ought to pass, in order to keep the ring steady. Thus, when the square head is turned by the screw-driver, it gradually removes the tin cylinder one inch backwards and forwards on that of wood; so as either to press the end A of the tin cylinder into contact with that of the wooden cylinder within it, or to remove it to the distance of one inch, and leave a void space at the end A.

5. The ends of all the holes of the tin cylinder are next to be enlarged, by slitting the tin 3-eighths of an inch towards A, on each side of the hole; that part, however, of the tin included between these two slits (which will be half an inch wide, and three-eighths of an inch in length, with respect to the cylinder,) is not to be cut out, but bent down into the excavations of the wooden cylinder beneath, so as to lie against that end which is nearest to it....But, before these pieces of tin are bent down, as just described, they should be filed somewhat smaller at the projecting than at the other end; because the excavations of the wooden cylinder are to be rather narrower at the bottom than at the top; and these pieces of tin, when bent down, ought to fit them exactly.

Lastly, when all these holes are thus enlarged, and the bits of tin filed somewhat narrow at their projecting ends, and then bent down into the excavations of the wooden cylinder, the other end of the tin cylinder, with its square socket, may be soldered on. Thus, when the end of the tin cylinder at A, is pressed forwards upon the wooden one towards B, by turning the screw at C, above described, all the excavations of the wooden cylinder will be gradually lessened, and at length entirely closed; by which means they may be adapted for the reception and delivering of seeds of any size, from horse-beans and peas to wheat, barley, and turnip-seed, with the utmost accuracy, so as to sow 4, 5, or 6 pecks per acre, or more or less at the pleasure of the cultivator, merely by turning the screw a few revolutions, in either direction.

In farther illustration of these principles, or directions, Dr. Darwin observes:

1. That in constructing tin and wooden cylinders beneath the seed-box, another small improvement may become necessary in sowing very small seeds, namely, when the screw at the end A, is turned so as to contract all the excavations of the wooden cylinder, its surface will become bare for the space of one inch from the end of each excavation towards the end B, (Plate I. Fig. 4,) without being covered by the tin cylinder. On these exposed parts, which will be one inch long, and half an inch wide, some seeds may accidentally stick, and evade the brushes which are to prevent them from passing, while the cylinders revolve. To remedy this inconvenience, when the wooden cylinder is placed within the tin one, in such a direction that all the holes are completely open, Dr. Darwin recommends a piece of the tin cylinder, about an inch and an half in length, and half an inch in width, to be cut out from the extremity of each hole next to the end B, and such piece to be fixed by a few sprigs on the wooden cylinder, exactly in the same place it covered previously to its being cut out of the tin one; by which means, when the tin cylinder is afterwards pushed forwards, by turning the screw at its end, so as to contract the excavations of the wooden cylinder beneath, its bare parts will be an inch and a half distant from the extremities of the excavations next to the end B; and thus will not pass under the brushes: consequently no small seeds can be lodged in them.

2. Some kind of iron staple ought to be fixed on the outside, at each end of the seed-box, to catch hold of the two springs at *d*, *d*, (Plate I. Fig. 1) when the hinder part of the carriage is elevated by the man guiding it, in order to suspend the coulters out of the ground, and to connect the hinder part of the machine with the shafts before: so that, when turning at the ends of the lands, or passing to or from the field, the wheels may not deviate from the joint *z*, at the centre of the axle-tree, but may follow in the same line as the shafts.

3. The seed-box should likewise be supported on erect iron pins, passing through staples of that material; with a lever under the end of it, next to the wheel *r*, *r*, (Plate I. Fig. 3,) in order to lift easily that end of the seed-box, about an inch high, and to raise the teeth of the iron cog-wheel on its axis out of the teeth of the correspondent iron one, on the nave of the carriage-wheel.

4. The construction of the coulters which make the drills, and of the rakes, by which they are filled after the seed is deposited, and also of the hoes, are not delineated; as they resemble those employed by persons practising the drill husbandry, and which we have already described, when treating of Mr. COOKE's patent machine.

5. When the lower ends of the seed-flues are placed through the holes in the coulter-beam (Plate I. Fig. 1,) at the distance of 9 inches from each other, the rows of wheat or beans will be 9 inches apart: hence, as the wheels of the carriage are 4 feet in diameter, and therefore move about 12 feet at every revolution: and, as there are 4 excavations round the axis of the seed-box, which revolve 4 times to one revolution of the carriage-wheels, consequently the seeds contained in the excavations of the cylinder beneath the seed-box, will be sown at 9 inches distance in each drill or furrow, while the plough is proceeding.

6. By Mr. COOKE's drill-plough, the quantity of seed sown on an acre is 6 or 7 pecks, that is, about half the quantity used in broad-cast sowing. If the wheat be exactly deposited in the drill, Dr. DARWIN is of opinion that one bushel will be fully sufficient for an acre, as the rows are nine inches apart from each other: for then 8 or 9 grains would be dispersed in every nine inches of the drill furrow; namely, in every square of 9 inches surface of the land so cultivated....This may be more clearly ascertained by the following data: Mr. CHARLES MILLER, in the "*Philosophical Transactions*," vol. lviii. has calculated the number of grains in a bushel of wheat to amount to 620,000; Mr. SWANWICK, of Derby, has lately computed them at 645,000; Dr. DARWIN, therefore, concludes that a bushel, on an average, contains 635,000 grains of wheat. A statute acre comprises 4,840 square yards, each of which contains 16 squares of 9 inches: if 4,840 be multiplied by 16, the produce will be 77,440, which is the number of squares of 9 inches in such an acre. If 635,000 grains in a bushel be divided by 77,440, (the number of squares of 9 inches in an acre), the quotient will shew, that somewhat more than 8 grains of wheat will thus be deposited in every 9 inches of the drills.

7. If 8 or 9 grains be dropped at the same time in one inch of ground, they will, if they all should grow together, be too numerous, and form a tussock; but, by making them slide down an inclined plane, from the seed-box to the coulters, as in the tin flues, which are crossed in order to lengthen them (Plate I. Fig. 2), some of the seeds will, by their friction while descending, be retarded more than others; and the 8 or 9 seeds will thus be scattered over the whole 9 inches of the drill; which renders this method of sowing far superior to that of dibbling; because, in the latter, all the seeds are dropped together.

8. When the holes in the wooden cylinder are entirely open, they are of a proper size for the sowing of horse-beans, or peas: when they are perfectly closed, there will remain a small niche at the end of the excavation in the wooden cylinder, nearest to B (Plate I. Fig. 4), for turnip, or other small seeds. For wheat, barley, and oats, a wooden wedge ought to be made exactly of the same shape as the

area of the hole, which the director of the plough requires, who will insert it occasionally in the holes, when he turns the screw at the end of the cylinder, in order to enlarge, or reduce them, according to those dimensions. On these wedges ought to be written, with white paint, *wheat*, *barley*, *oats*, &c. which will considerably facilitate the accommodation of the size of the excavations to each kind of grain; and which may be altered, if requisite, to suit larger or smaller seeds of the same species.

9. In some drill-ploughs, for instance in Mr. Cooke's, there is some additional machinery for drawing a line, while the plough proceeds, in which the wheel that is next to the last-sown furrow, may be directed to pass at a proper distance from, and parallel to it. This, however, may be effected, when sowing wheat, or peas and beans, by making the wheels, while they run on the ground, at the exact distance of 54 inches from each other; and, at the time of sowing, by guiding the wheel nearest to the part last sown exactly in the rut last formed; by which means every row will be accurately made, at the distance of 9 inches.

To these observations, Dr. Darwin has subjoined some remarks, tending to evince, by comparison, the essential improvements he has made on this complicated machinery, and from which we extract the following:

1. The simplicity of his drill-plough consists, first, in its having a seed-box only, and not a seed-box and hopper, as is the case with Mr. Cooke's patent drill-plough.

2. The flues, conducting the seed from the bottom of the box into the drill furrows, are not disjoined in the middle, to permit the lower part to move either to the right or left, when the horse deviates from the line in which the coulters pass, as in Mr. Cooke's plough: this defect may be remedied by the simple universal joint at *z*, (Plate I. Fig. 1).

3. In this machine, the shafts behind, between which the man guiding the coulters walks, are fixed to the coulter-beam, as well as to the axle-tree; whereas, in Mr. Cooke's patent drill-plough, all these are moveable joints, similar to a parallel rule, in order to counteract the swerving of the horse; which, in this machine, is effected by the simple universal joint at *z*, (Plate I. Fig. 1), already described.

4. The dimensions of the holes in the axis of the seed-box, are here likewise altered, merely by turning a screw, so as to accommodate them to every kind of seeds which are usually sown on fields, or arable lands.

5. The strong brush of bristles, which sweep over the excavations of the cylinders beneath the seed-box, and strickle them so exactly, that no supernumerary seeds escape; and yet none are either bruised or broken, which sometimes happens in Mr. Tull's original machine.

Lastly, Dr. Darwin justly observes, that the cheaper and more simple the machine is in its construction, the less liable will it be to accidents, which occasion expences in its repair; and, with the greater facility will its management be understood; all which circumstances correspond with its greater simplicity: and, we cor-

dially hope with the Doctor, that the practice of the drill-husbandry will thus be more generally diffused.

Plate II. *Fig.* 1, is a seed-box, invented by Mr. Swanwick, of Derby, who has liberally offered to shew the working models of the seed boxes, or to assist any person who may wish to construct either this drill machine, or the preceding one, invented by Dr. Darwin.

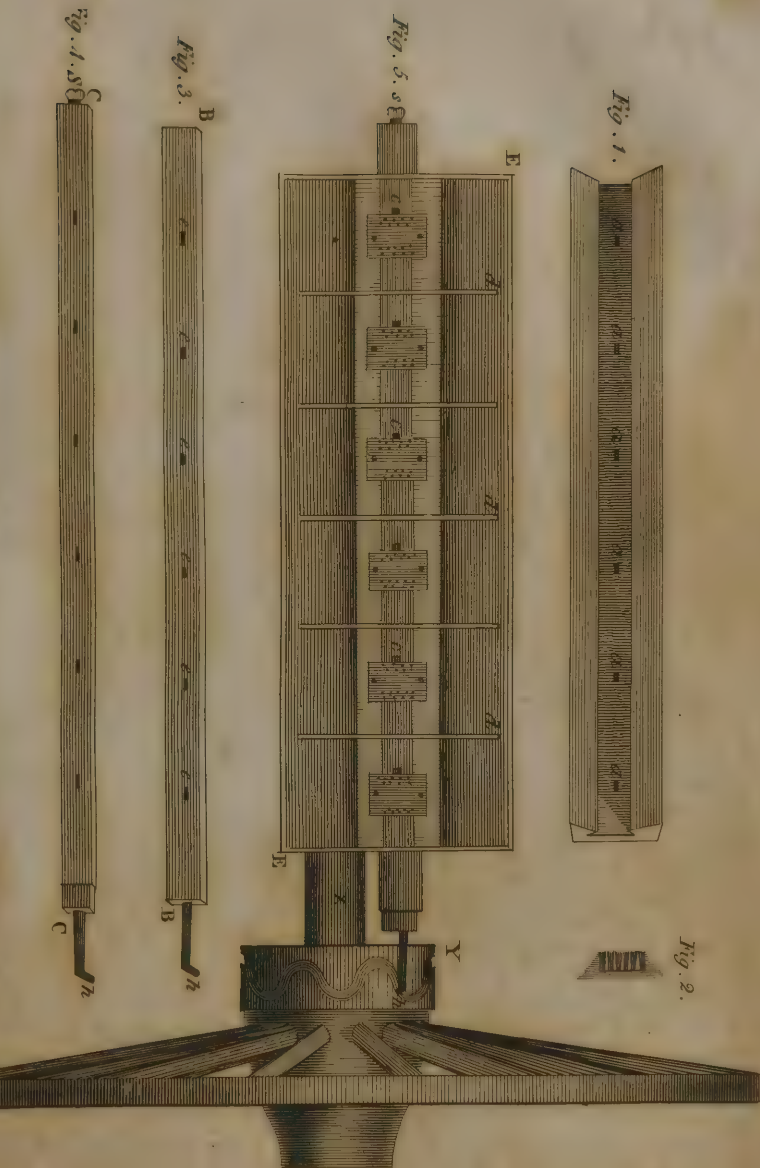
Mr. Swanwick's seed-box is 43 inches in length within, and is divided into 6 cells, for the purpose of sowing 6 rows of seeds at the same time, similar to that above specified. At the bottom of each cell is a hole *a*, *a*, *a*, *a*, *a*, *a*, (Fig. 1), through which the seed passes into the seed-flues, as in the machine before described; but this has no revolving axis, there being only a wooden or iron bar, B, B, (Fig. 3), about 2 inches broad, 4 feet 8 inches long, and exactly 3-eights of an inch thick. Through this bar 6 holes are perforated, marked *c*, *c*, *c*, &c. each of which is exactly one inch in length, half an inch in width, and 3-eighths of an inch in depth, which is the same as the thickness of the bar. The centres of these holes are exactly 8 inches distant from each other, corresponding to the holes at the bottom of the seed-box, over which it is made to slide backwards and forwards in a groove. By this sliding motion, it passes under stiff brushes which are placed over it on each end of the holes, at the bottom of the seed-box, and strickle off the grain, as the holes in the sliding-bar pass under them, which thus distribute the quantity with considerable accuracy.

In order to increase or diminish the proportion of grain to be delivered, the slider is covered with a tin-case, C, C, (Fig. 4), which is perforated with six holes, corresponding with those in the slider: instead, however, of the bit of tin being cut out the full length of the hole, part of it is left at the end equal to the thickness of the slider: and is bent down, after the slider is put into the case, in the same manner as the tin cylinder in the preceding machine. This case is moveable about one inch, backward and forward, by turning the finger-screw *s* (Fig. 4 and 5), by which the holes are enlarged, or diminished, for the purpose of adapting them to various sorts of grain, or different quantities of the same sort, exactly as in the tin and wooden cylinders in Plate I....The slider is moved forwards, by a bent iron pin, *h*, attached to it, which passes into a serpentine groove, Y, (Fig. 5), fixed to the nave of the wheel: it is likewise moved backwards by a steel spring at the other end of the seed-box, but which is not delineated in the Plate.

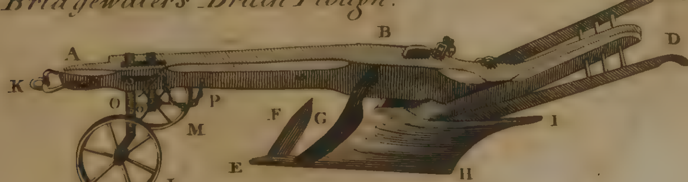
Fig. 5. is a bird's-eye view of the parts before described:....E, E, the seed-box divided into cells or compartments, by the partitions *d*, *d*. *d*.....*c*, *c*, *c*, the slider, with part of the apertures seen just appearing from under the brushes....X is the axis of the wheel.

Fig. 2, represents a side view of one of the six bridges lying over the holes at the bottom of the seed-box, on each side of which the brushes are fixed, which strickle the holes when full of corn, while the bar slides backwards and forwards. The simplicity of this slider at the bottom of the seed-box, Dr. D. observes, may be, in

Dr. Lummis's Improvements of the Drill-plough



Bridgewater's Drain Plough.



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some instances, greater than that of wooden and tin cylinders in his machine, as Mr. SWANWICK's has only six holes for distributing the quantity of corn, whereas the former has twenty-four. In other respects, it is, perhaps, more complicated; as twelve brushes are used, one on each side of the six holes, whereas there are only six brushes rubbing on the tin cylinder in the former machine. The reciprocating motion of this slider must be quick, as it necessarily acts once every time the circumference of the carriage-wheel passes nine inches forward, which may not be so easy to execute as the cog-wheel, with the uninterrupted movement of the axis and cylinder in the preceding machine.

Lastly, Dr. DARWIN concludes with remarking, that the facility of adapting the holes to the dimensions required in both machines, and the circumstance, that they neither bruise nor break the grain, and are not encumbered with an additional hopper, which must deliver the quantity of seed with great inaccuracy, from the unequal shaking of the machine, considerably add to the excellence and simplicity of both.

Another implement upon a new principle, was invented by Mr. JOHN HORN, of Dover, and by him denominated an "*Universal sowing machine, for drilling or broad-casting*;" for which he obtained a patent, about the year 1785. It is so constructed that, whether worked by the hand, drawn by a horse, or fixed to and used with a plough, it is not liable to be put out of order; there being but one movement to direct the whole. It sows every kind of grain with equal ease and regularity, so that the quantity sown may be varied at pleasure, and in any degree. A correspondent in the 12th vol. of "*Annals of Agriculture*," p. 481, states, that Mr. HORN's invention possesses the peculiar advantage of cultivating turnips, so as to ensure the crop against the ravages of the fly. By sowing the *usual quantity* of turnip-seed *broad-cast* by the machine, and at the same time, striking furrows at proper distances in the land, part is deposited in the drills, and the rest sown broad-cast between them; so that, if the season be dry, it will be favourable to the drills, and, if wet, to that which is broad-cast. And if it happen that the latter be injured by the depredations of the fly, the former, by coming at a later period, is saved; or, if the former be destroyed, the latter is preserved. If the whole thrive, the farmer has the choice of selecting the most vigorous plants from both. The price of this valuable implement, if constructed so as to be used with a single furrow plough, is, we understand, 3½ guineas: if intended for a double furrow plough, 4½ guineas: that of the large machine, consisting of a seven-furrow plough, with Mr. HORN's additions, the whole made by himself, is 7½ guineas. For a more particular account, we refer the reader to a treatise on the subject, published by the inventor (8vo. 6d. Johnson, 1786), entitled "*Description and Use of the Universal Sowing Machine for Drilling and Broad-casting*."

In the 12th vol. of *Annals of Agriculture*, p. 17, we also meet with a communication from a Mr. J. HARVEY, of Elmley, in which he announces his invention of an engine that plants every kind of

grain, in a manner, he conceives, never before attempted. It is a common wheel-plough, to which is fixed a simple piece of machinery, for conveying, by means of an engine fixed to the plough, immediately behind the mould-board any quantity of grain into an incision in the heart of a furrow, of whatever depth: the seed is effectually and instantly covered by an instrument suspended to the engine.... The whole machinery consists of iron, yet does not exceed 20 lbs. in weight. The engine may be worked without a handle (unless at the end) which does not retard the sowing, or add much to the labour of the horses. The inventor observes, that it may be employed on any soil, and in all seasons; the seed being covered to protect it from the effects of the weather....The price of Mr. HARVEY's implement, exclusively of the plough to which it is fixed does not exceed three guineas.

The last of these various contrivances, of which we shall take notice, is the *Drill* and *Hoe-Plough*, invented a few years since, by a Mr. RIDGE, of which an engraving is given in the 60th vol. of the *Gentleman's Magazine*, for 1790, where its principles and mechanism are described. This machine is so constructed, that by means of a handle, the man employed has power to hold or guide it in a strait direction, without any attention to the going of the horse being requisite, farther than is rendered necessary in a common plough: and, whether the implement be drawn up, or down a hill, or horizontally, it deposits the corn with equal regularity, and at any given depth; so that none of the seed will be buried too deeply in the earth, or exposed to perish on the surface.... Thus, it is asserted, one third of the usual quantity of seed may, in general, be saved; and, in some cases, more than one half.

The wheels on which Mr. RIDGE's plough moves, are half a rod in circumference; and, by computing their revolutions, when they have once passed over the field, the portion of seed sown may be ascertained, if the machine be supplied with a certain quantity. The number of acres that can thus be drilled in one day, depends on the distance at which the rows of corn are set. Stones, it is said, are no obstruction to the drilling of corn, by means of this implement; provided they be not too large to pass between the tines, or tubes, which deliver the seed to the ground.

The plough here alluded to, may be used for sowing every kind of grain, or seeds, not only with facility and regularity, but also without bruising them; and, as soon as the crop grows up, it may be employed with equal advantage as a horse-hoe. Its construction is stated to be so simple, that in half an hour a common ploughman may be made to comprehend its movements, sufficiently to be entrusted with it for the whole season. On level soils, one horse, in general, will be fully competent to draw it; but, in ascending steep hills, or on very stiff land, two will become necessary. The price of this expensive implement, we understand, is about 14 guineas.

For a more particular account of the drilling system, we must refer our readers to Mr. AMOS's "*Theory and Practice of Drill-Husbandry*," (4to. 18*s*.) published a few years since, in which the matter is fully investigated, and the ad-

vantages and disadvantages are fairly appreciated. But those, who wish to acquire only a general knowledge of this important practice, we advise to peruse the Rev. Mr. Cooke's pamphlet, (12mo. pr. 6d.) entitled, "*Drill-Husbandry perfected.*"

Before we conclude this highly important subject, it will be useful to state the extraordinary national saving that would arise from a general introduction of the drill-husbandry. Indeed, the patriotic Lord Somerville, late President of the Board of Agriculture, whose exertions in promoting that beneficial science, must endear him to every friend of his country, has already anticipated our calculations. Though bred to the broad-cast method, which he till lately followed, that enlightened nobleman, has, in the appendix to his interesting work, entitled, "*The System followed during the two last years by the Board of Agriculture,*" &c. (8vo. pp. 300, Miller, 1800), impartially exhibited the great advantages that might result from the national adoption of the drill-husbandry.... We regret that our limits will permit us only to extract a few leading circumstances from his Lordship's publication. In order to ascertain, beyond the possibility of doubt, the infinite superiority of the drilling, over that of the broad-cast method of sowing, he applied to three gentlemen alike eminent for their agricultural skill, and each of whom made use of different drill-ploughs. From an accurate statement it appears, that the expences attendant on the old and new practices, are as follow:

Expence of seed-corn on 133 acres of land, sown in the usual broad-cast husbandry in 1799, was . . . . *L.*	134	10	6
The expence of seed-corn for the same number of acres, according to the present improved system of drilling, .	100	4	6
In the year 1800, the expence of 140 acres broad-cast, was	216	10	0
Ditto, ... ditto, . . . drilled, ...	92	0	0
Which affords a saving of not less than . . . . in seed-corn on 140 acres of land.	124	10	0

Both estimates were made from actual experience, by the industrious Mr. Budden, and communicated to Lord Sommerville, by the Rev. H. J. Close, of Hordle, near Lymington; from whose letter we insert the following computation of an *annual saving* that may be effected by the uniform practice of the drill-husbandry; and which, at a moderate calculation, will amount to not less than *eight millions* of bushels of wheat, *one million* of bushels of rye, *three millions* of bushels of barley, *four millions* of bushels of oats, and *one million* of bushels of beans and peas!

Having, however, in the course of attentive observation, during the last twenty years, witnessed many disappointments, both in *statistical* and *political* schemes, we are not so sanguine in our expectations, as to place implicit confidence on any general statement, especially when it is exemplified by *round* numbers. Nevertheless, in justice to the zealous supporters of the drill-plough, we fully admit its superiority over the clumsy and irregular practice

of the wasteful broad-cast husbandry; and posterity will ever gratefully remember the names of TULL, COOKE, YOUNG, and DARWIN, if, by their joint labours, *one half* of the above stated quantity of grain and seeds, that is, together *eight or nine millions of bushels*, could be *annually* saved to the nation, before one half of the present eventful century is expired.

DRINKING, is one of the animal functions, essential to the proper solution and digestion of food. Although the proportion of liquid to that of dry, or solid food, cannot be precisely ascertained; yet, if the constant secretion of fluids be laid down as the basis of this computation, we should, perhaps, drink double the quantity of the solid provisions we daily consume. Nevertheless, even this proportion is but too often exceeded, merely to please the artificial cravings of a corrupted palate. Thus, we no longer drink with a view to quench thirst only; but at *certain* hours of the day, whether we are naturally inclined, or not. Nay, we frequently meet with sots in beer, ale, spirits, wine, punch, and even *tea*......Excessive drink, however, though it distend and oppress the stomach, and thus impede digestion, is not nearly so pernicious as gluttony, unless the former be attended with intoxication. It however impoverishes the whole mass of the blood, by rendering it too thin and watery; so that relaxation of the urinary and other canals, at length, general debility of the system, are its necessary concomitants.

On the contrary, too little drink disposes persons of a sedentary life to indigestion; because many particles of solid food are, for want of dilution, passed unassimilated through the alimentary canal; and the blood becomes viscid, and inert in its circulation. The active and laborious should, therefore, drink more than the idle or phlegmatic; and either of these more in summer than in winter, to supply the great loss of humours exhaled by insensible perspiration.

Persons, whose natural appetite is not depraved in consequence of irregular living, may easily regulate the due proportion of their drink to that of dry aliment; as, to them, thirst will be the safest guide. But those individuals who have become slaves to the libations of Bacchus, are unfortunately deprived of this beneficent instinct, which is the privilege even of irrational animals.

If the moral turpitude of committing excess in drinking, affords no argument to induce the habitual votary to abstain from such pernicious practice, we shall only add, that he will sooner or later feel the effects of it in painful and lingering sickness. To a reflecting mind, it affords matter of just surprize, how so many persons of worth and character, *while sober*, can devote themselves to a custom which they cannot but abhor in their friends. For the sake of a momentary gratification of the palate, wines and spirits are indiscriminately swallowed, and especially by those whose age, labours, and merit in society, often entitle them to neither. Immense quantities of valuable grain, by nature designed for the support of the poor and indigent, are annually converted into *liquid fire*, or more properly, *poison!* Where is the philanthropist, in our imperial senate, who possesses virtue and influence sufficient

to stem the torrent of so extensive a system of mischief?

After this involuntary digression, we shall only observe, that large potations are, at all times, and in every constitution, improper; that they are particularly injurious when indulged in previously to the taking of food, and especially before dinner; that all beverage is more pernicious to the healthy in a *warm*, than in a *cold* state; that the human stomach should never be *inundated* with immoderate quantities of drink at one time; and that the most natural drink, and the most conducive to health, without exception, is *pure water*.

DRONE, in natural history, a species of bee, which is nearly double the size of the common working insect. The head of drones is round, the eyes full, the tongue short, and the belly broader than in the other classes; they are likewise of a darker colour, and more thickly clothed....See BEE.

DROPSY, a soft, unelastic swelling of the whole or part of the body: in other words, a collection of water under the whole skin, or in the brain, chest, abdomen, &c.

This complaint may originate from various causes, of which the following are the principal: 1. Obstructions in the intestines of the lower belly, especially after agues. 2. Suppressions of natural and periodical fluxes; polypus and other concretions in the blood vessels. 3. Obstipations of the lymphatics, arising chiefly from a free use of spirituous liquors. 4. Great relaxation of the vascular parts, in consequence of poor, watery, and viscid nutriment, impure, damp air, &c. 5. A general acrimony of the fluids, after repelled eruptions, or from an accumulation of acrid, gouty, bilious, and other humours. 6. General debility, consequent to copious evacuations, or convulsive diseases, which have reduced the whole nervous system: the operation of all these causes is often promoted by an hereditary disposition of the individual.

Regimen....Drinking was formerly considered as very injurious to dropsical patients, so that physicians often prohibited the use of all liquid food. Later experience, however, has evinced the fallacy of this rule; for, in many cases, the disease has been cured merely by *abundant dilution*; especially in those constitutions which are not naturally phlegmatic. Hence it has been found, that the copious use of mineral waters (see DIURETICS) has frequently been attended with the best effects....Vegetable acids, such as vinegar, the juice of lemons, oranges, &c. diluted with water, should be drunk in preference to wines or spirits, either of which are generally hurtful. The aged and emaciated, however, may occasionally take a glass of wine, or, with equal advantage, mustard, whey, or ginger-tea. Their diet ought to consist of nourishing and stimulating dishes, but of easy digestion, and to be taken in moderation. White meat, fowls, and even game properly roasted or stewed, may be eaten with toasted bread and biscuits. Horse-raddish, onions, and garlic, may be used instead of foreign spicies, and in large proportions. But tea, coffee, and punch, are alike improper for irritable and nervous habits.

Muscular exercise and gentle, but often repeated friction of the parts affected, are two primary objects which deserve attention....

The patient ought to live in a warm, dry place, not expose himself to cold or damp air, and wear flannel next the skin, to promote perspiration. The tepid bath has often procured considerable relief.

Medicine. In the beginning of the disease, brisk laxatives, consisting of rhubarb and cream of tartar, may be of immediate service to the young and robust, but to aged or debilitated patients, we cannot with safety recommend either purgatives or emetics; as the latter in particular, may be attended with serious consequences. In such cases, medical advice should not be neglected. In general, however, small doses of cream of tartar, namely, half a dram, six or eight times a-day; and from six to ten grains of salt-petre, with three or four grains of powdered squill, every morning and evening, may be taken without risk, if professional assistance cannot be easily obtained. All other drugs, for instance, bark, tartar emetic, camphor, opium, &c. are powerful remedies, which ought to be prescribed by those only who possess the ability of ascertaining the nature and cause of the disease. For similar reasons, we cannot implicitly approve of the external application of *oil*, nor the swallowing of a table spoonful of *common sand* every day: this is a curious, but cheap remedy, which has lately been announced by Dr. GUTHRIE, of St. Petersburgh, who informs us that it was found "to purge the patient pretty briskly, and to procure a relief of all the symptoms."

[The dropsy is commonly supposed to proceed in every case from great debility: and hence strengthening remedies are given almost indiscriminately. But there is no truth better ascertained than, that dropsies are frequently accompanied by a *tense full pulse*, and other symptoms which denote too much action in the system. We ought not, therefore, to be alarmed when a judicious physician prescribes *bleeding*, *low diet*, and *purgatives*, for a dropsical patient. Those who wish to satisfy themselves of the propriety of occasional evacuations in this disease, are referred to Dr. RUSH's works, in which they will find a valuable paper on the subject, which indeed ought to be read by every sufferer from the complaint.

The *digitalis purpurea*, or Foxglove, has been much celebrated as a remedy for this complaint, and has certainly done good. See FOXGLOVE.

A watery decoction of the *Dwarf elder*, *Ebulus*, is said to have cured very desperate cases of dropsy..... Dr. FOWLER relates several cases of the successful use of the infusion of tobacco in various species of dropsy, and Dr. GARNETT has recorded the history of an Anasarca cured by giving 30 drops of it morning and evening, in a cordial aromatic mixture; and by employing tonics after the swelling was removed.

Mercury, when given in small doses, so as to excite a gentle salivation, has frequently cured the dropsy. Artichokes are considerably diuretic, and have been properly proposed as part of the diet of dropsical patients.]

DROPWORT, or *Oenanthe*, L. a genus of perennial plants, consisting of seven species, five of which are indigenous; among these the following only deserve notice:

1. The *fistulosa*, or COMMON WATER DROPWORT, which thrives in meadows, ponds, and ditches; and flowers in July. Its naked

stalk grows only 12 inches high. The plant is refused by cows and horses; though, from experiments made in this country, it does not appear to be noxious to the former. BECHSTEIN, however, affirms, that in Germany this species of the dropwort is a poisonous vegetable, and has been found to produce dangerous effects on man and dogs; its root, therefore, which spreads extensively in a swampy soil, ought to be carefully extirpated.

2. The *crocata*, or HEMLOCK WATER-DROPWORT, or Dead-tongue, which grows in watery places, on the banks of rivers, and in ditches. Its reddish thick stalk attains a height from 3 to 5 feet. According to Dr. WITHERING, the whole of this plant is deleterious; and Dr. PULTENEY remarks, that the root is the most virulent of all the vegetable poisons that Great Britains produces; many instances of its fatal effects being recorded. Unless the contents of the stomach, after eating any small portion of this root (which is sometimes mistaken for wild celery, or parsnip) be immediately emptied by briskly operating emetics, there is no other chance of saving the patient's life; because it speedily produces convulsions, madness, and death.

As a medicine, however, an infusion of the leaves, or three tea-spoonfuls of the juice of the root, taken every morning, has in one instance cured a very obstinate cutaneous disease: though we advise such trials to be made only with animals. According to Mr. GOUGH, the country people in Westmoreland apply a poultice of the herb to the ulcer, which is sometimes formed in the fore part of the cleft of the hoof in horned cattle, and is termed the *foul*. The inhabitants of Pembrokeshire call this plant, the *five-fingered root*: it is much used by them in cataplasms for the *felon*, or the worst kind of whitlow. Sheep eat the leaves of this vegetable, but they are refused by cows and horses.

DROWNING is the act of suffocating, or being suffocated, by a total immersion in water. The length of time during which a person may remain in this element, without being *drowned*, is very unequal, in different individuals; and depends as much on the temperature of the water as on the particular constitution of the subject: in general, however, there is less prospect of recovery, after having continued fifteen minutes in a watery grave. In such cases, death ensues from impeded respiration, and the consequent ceasing of the circulation of the blood, by which the body loses it heat, and, with that, the activity of the vital principle. Dr. GOODWIN justly observes, that the water produces all the changes which take place in drowning, only *indirectly*, by excluding the atmospheric air from the lungs, as they admit but a very inconsiderable quantity of fluid to pass into them, during immersion. Hence we shall find, in the progress of this enquiry, that inflation of the lungs is one of the principal means of restoring life.

Before we describe the various methods and instruments that have been successfully adopted, for recovering drowned persons, it will be useful to advert (on the plan of Dr. STRUVE) to those circumstances which deserve to be duly weighed, previously to any *active* measures being taken on such unfortunate occasions: 1. The season and weather; 2. Length of time the person

has continued under water; 3. The state of his mind when the accident happened: whether he was intoxicated, frightened, &c.; 4. Constitution of the body, and whether he was in a state of perspiration; 5. The height from which he fell, and whether his head plunged foremost; 6. Depth of the water; whether it was cold or warm, sea, or river water, and how he was dressed...... Lastly, 7. The manner in which he was taken out, whether by the legs, and without receiving any injury, or by instruments; and whether he was rolled about in a tub, or what other methods were pursued for his restoration.

Few improvements appear to have been made in the treatment of the drowned, since this important branch of medical science was first discussed," in a *popular* manner, by the late Dr. TISSOT; yet the names of CULLEN, GOODWYN, COGAN, HAWES, and COLEMAN, in Britain, as well as those of UNZER, REIMARUS, and STRUVE, in Germany, deserve to be respectfully mentioned: from their various publications, and especially of the two last mentioned: we shall briefly state the principal rules of conduct to be observed, with respect to persons in that deplorable situation.

Symptoms of Apparent Death by Drowning.....Coldness; paleness of the whole body; the lips of a livid hue; the mouth either open or firmly closed; the tongue blue, swelled and protruded; the eye-lids closed, the eyes turned, and their pupils dilated; the face swelled and blue; the lower belly hard and inflated. The first signs of returning animation are, convulsive starting of the muscles of the face, or feet; motion of the eye-lids, a spasmodic shivering of the body.

Treatment. 1. After having been carefully taken out of the water by the arms, so as to prevent the least injury to the head and breast, the body ought to be carried to the nearest house (if possible, in a bier, as represented in the plate which is described p. 392), with the head somewhat raised; or, in fine warm weather, the resuscitative process may with more advantage be performed in the open air, especially in sun-shine.

2. When the subject is deposited, the upper part of the body should be supported half-sitting, with the head inclining towards the right side.

3. The clothes are to be taken off without delay, but with the greatest precaution; as violent shaking of the body might extinguish the latent spark of life.

4. The mouth and nose must be cleansed from the mucus and froth, by means of a feather dipped in oil.

5. The whole body should now be gently wiped and dried with warm flannel cloths, then covered with blankets, feather-beds, hay, straw, &c. In cold or moist weather, the patient is to be laid on a mattress or bed, at a proper distance from the fire, or in a room moderately heated; but in the warm days of summer, a simple couch is sufficient.

6. If the patient be very young, or a child, it may be placed in bed between two persons, to promote natural warmth. (See also the *Warming Machine*, delineated in the second plate and described p. 393.

7. In situations where the bath cannot be conveniently procured, bladders filled with lukewarm water should be applied to different parts of the body, particularly to

the pit of the stomach; or a warming-pan wrapped in flannel gently moved along the spine; or aromatic fomentations frequently and cautiously repeated.

8. As the breathing of many persons in an apartment would render the air mephitic, and thus retard, or even prevent the restoration of life, not more than five or six assistants should be suffered to remain in the room where the body is deposited.

Stimulants generally employed:

1. Moderate friction with soft, warm flannel, at the beginning, and gradually increased by means of brushes dipped in oil, till pulsations of the heart are perceptible.

2. Inflation of the lungs, which may be more conveniently effected by blowing into one of the nostrils, than by introducing air into the mouth. For the former purpose, it is necessary to be provided with a wooden pipe, fitted at one extremity for filling the nostril, and at the other for being blown into by a healthy person's mouth, or for receiving the muzzle of a pair of common bellows, by which the operation may be longer continued. At first, however, it will always be more proper to introduce the warm breath from the lungs of a living person, than to commence with cold atmospheric air. During this operation, the other nostril and the mouth should be closed by an assistant, while a third person gently presses the chest with his hands, as soon as the lungs are observed to be inflated.....For a more effectual method of alternately introducing fresh air into the lungs, and expelling that which is rendered mephitic, or unfit for respiration, we refer the reader to the second plate Fig. 1.

3. Stimulating clysters, consisting of warm water and common salt; or a strong solution of tartar emetic; or decoctions of aromatic herbs; or six ounces of brandy, should be speedily administered.... We do not consider injections of the smoke of tobacco, or even clysters of that narcotic plant, in all instances safe or proper.

4. Let the body be gently rubbed with common salt, or with flannels dipped in spirits: the pit of the stomach fomented with hot brandy; the temples stimulated with spirit of hartshorn; and the nostrils occasionally tickled with a feather.

5. Persons of a very robust frame, and whose skin after being dried, assumes a rigid and contracted surface, may be put into the sub-tepid bath, of about 65 deg. which must be gradually raised to 75 or 80 deg. of FAHRENHEIT's scale, according to circumstances; or the body carried to a brewhouse, and covered with warm grains for three or four hours: but these expedients generally require medical assistance.

6. Violent shaking and agitation of the body by the legs, and arms, though strongly recommended, and supposed to have often forwarded the recovery of children and boys, appears to us a doubtful remedy, which can be practised only in certain cases.

7. Springling the naked body of a drowned person with cold water; submitting it to the operation of a shower-bath, or the sudden shocks of the electric fluid; as well as whipping it with nettles, administering emetics, and blood-letting, ...are desperate expedients, which should be resorted to only after the more lenient means have been unsuccessfully employed.

It is, however, a vulgar and dan-

gerous error, to suppose that persons apparently dead by immersion under water, are irrecoverable, because life does not soon reappear: hence we seriously entreat those who are thus employed in the service of humanity, to persevere for three or four hours at least, in the application of the most appropriate remedies above described; for there are many instances recorded, of patients, who recovered, after they had been relinquished by all their medical and other assistants.

Treatment on the return of life:

As soon as the first symptoms of that happy change become discernible, additional care must be taken to cherish the vital action, by the most soothing means. All violent proceedings should, therefore, be immediately abandoned, no farther stimulants applied, nor even the ears of the patients be annoyed by loud speaking, shouting, &c. At that important crisis, moderate friction only is requisite. And, if the reviving person happen to be in the bath, he may either remain there, provided his sensations be easy and agreeable, or be removed to a comfortable bed, after being expeditiously dried with warm flannels: fomentations of aromatic plants may then be applied to the pit of the stomach; bladders filled with warm water, placed to the left side; the soles of the feet rubbed with salt; the mouth cleared of froth and mucus, and a little white wine, or a solution of salt and water, dropped on the tongue. But all strong stimulants, such as powerful electric shocks, strong odours of volatile salts, &c. are at this period particularly injurious. Lastly, the patient, after resuscitation, ought to be for a short interval resigned to the efforts of Nature, and left in a composed and quiescent state: as soon as he is able to swallow, without compulsion or persuasion, warm wine, or tea, with a few drops of vinegar, instead of milk, or gruel, warm beer, and the like, should be given in small doses frequently repeated.

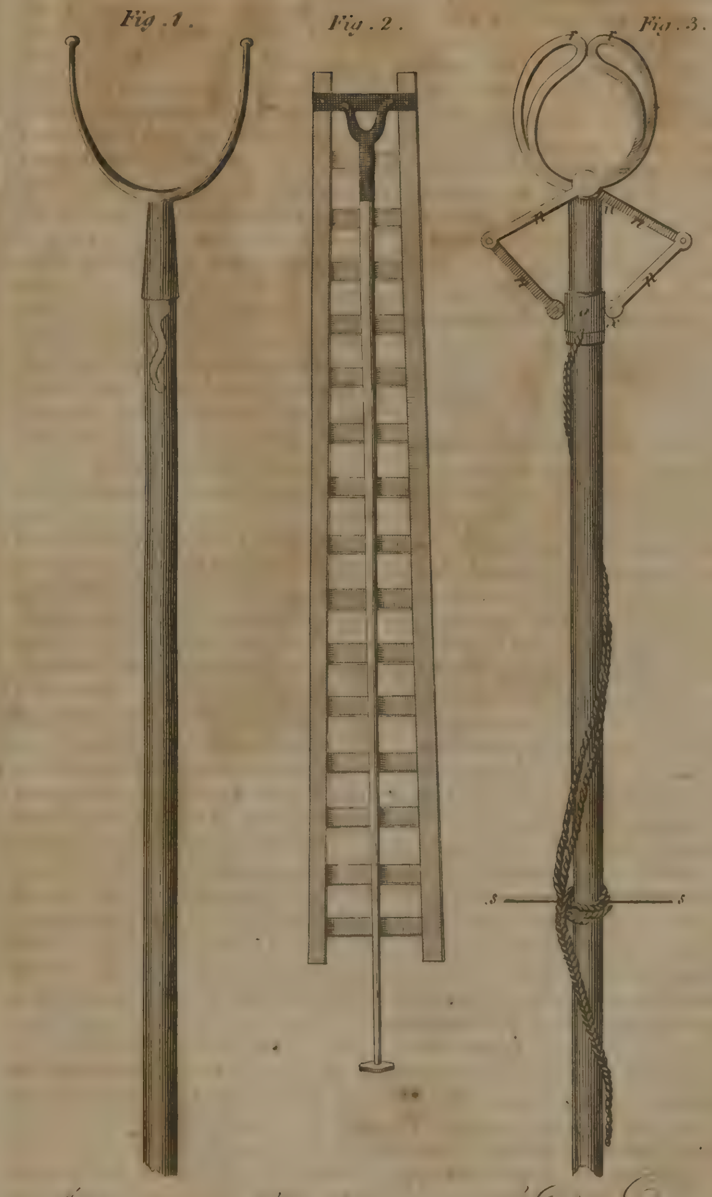
Having stated the leading particulars to be attended to, in the practical treatment of persons who are on the eve of suffering from aquatic suffocation, we shall accompany them with a few directions, addressed to those humane assistants who often fall victims, for want of due precaution in the execution of their benevolent design.

As many fatal accidents happen to individuals who wish to rescue others in danger of being drowned, especially when the former are unskilful in the useful art of swimming, which ought to be learnt at an early period of life, we think it our duty to remind the reader of the two excellent contrivances already described in our first volume, under the articles AIR-JACKET, and BAMBOE HABIT. Every family dwelling on the banks of lakes or rivers, or near ponds, ought to be always provided with two or three such useful articles, to serve in cases of emergency; as it will generally be too late to procure them on the spur of the occasion.

EXPLANATION.

I. *Of the Plate representing the "Instruments for recovering the "Drowned."*

Fig. 1, A forked instrument with blunt points, for making a superficial search after the drown-



Instruments for recovering the Drowned.

ed body, and sounding the particular situation in which it lies.

Fig. 2, A ladder with a long, jointed handle, and which we have already mentioned, when treating of the ICE-BOATS: a model of these boats may be inspected in the Repository of the "*Society for the Encouragement of Arts, Manufactures*," &c. Adelphi, London.

Fig. 3. An *extractor*, or a linked pair of tongs, which in the plate appears closed; but, on immersing it into water, opens by its own weight, as well as by the sliding down of the iron ring *o* from the part marked *x*, to that of *u*. It may again be closed, by pulling the double rope fastened to the ring *o*, which is thus shifted upward from *u* to *x*: by means of expanding the iron arms *n n*, which are likewise connected with this ring, the mouth or flaps of the instrument *r r*, may be shut: and to prevent their opening till required, the two ropes are firmly tied round the iron bolt *s s*; in which situation they remain till the body is extracted.... This instrument, together with that represented, Fig. 1, cost about 2l. at Hamburg. Great attention is required in preserving them from the effects of rust; and, independently of the weight of iron-work, Fig. 3, is perhaps the most complete piece of machinery that can be contrived for this purpose.

II. *Of the Engraving in which the "Implements of restoration from drowning," are represented.*

Fig. 1, A pair of bellows with two separate bags, so contrived that by opening them, when applied to the nostrils or mouth of a patient, one bag will be filled with common air, and the other with the mephitic air extracted from the lungs; and, by shutting them again, pure atmospheric air will be introduced into those organs, and that drawn out, consequently discharged into the room. Thus, the artificial breathing may be continued, while the other operations on the surface of the body are carried on; which could not be conveniently done, if the muzzle of a common pair of bellows were introduced into the nostril.

a, Is an intermediate board, but which admits of no communication between the two bags. In the external board of each side, there is the usual hole, marked *b*, provided with a valve; and the cylindrical part through which the air is expelled in common bellows, is here soldered to a copper box, within which two other valves are applied to the tubes conducting the air.... The cover *d* of this box, which may be unscrewed by means of an interposed leather ring, is almost of the shape of a funnel, to the neck of which is fastened a flexible tube *e*, made of varnished silk cloth, and a spiral wire that forms the cavity. To the extremity of this tube is attached a small ivory pipe *f*, the front of which may be either tubular and round, for introducing it into the nostril: or flat like the top-piece of a clarionet, if it be intended for the mouth. The valves (which cannot be represented in a plate), consist of stiffened taffety, and are so arranged, that the corresponding ones stand in an inverted order. If, therefore, both bags of the bellows are expanded, *two* of the valves open themselves towards the internal part of the machine: one of these is fixed to one of the side-boards, but the other is within the box, in the mouth of the conducting tube belonging to

the opposite bag of the bellows. By this contrivance, the air enters both bars of the bellows at the same time, and is, on compression, again expelled by means of two other valves, which open from within towards the external parts. Both bags of the bellows terminate below the valve in one particular tube of communication; because, though the action of both bellows is *simultaneous*, the stream of air, conformably to the arrangement before pointed out, can only enter, and escape, *alternately*....In using this machine, the small ivory pipe is applied either to one of the nostrils, or put into the mouth: in the former case, the other nostril and the mouth must be closed; in the latter, both nostrils. When the bellows are set in action, one of the bags receives a column of atmospheric air through its valve; while the other, by means of its flexible tube and its valve, extracts a portion of air from the lungs. But, if the bellows are again shut, one of the bags parts with the impure gas drawn out of the pulmonary vessels; and the second conveys pure atmospheric air to the organs of respiration. By properly repeating this alternate process, the patient may again be enabled to exercise the important function of breathing. As, however, a precipitate and irregular method of proceeding might be productive of injury, this delicate operation ought to be performed by persons who are acquainted with the mechanism of respiration....In some cases, where the patient has, for a considerable time, lain under water, or was afterwards neglected for want of due assistance, it would be desirable to introduce into his lungs *oxygen*, or pure vital, dephlogisticated air, instead of that of the common atmosphere; as the latter is generally more or less corrupted on such occasions by the breath of many persons in the same room. For this purpose may be used a bladder, marked *g*, which is provided with a cock and pipe fitted or screwed to the board of the inspiring valve and bag of the bellows. If, therefore, after opening the cock, the machine is set in motion, it will extract the pure air contained in the bladder, and, on the subsequent compression of the bellows, force it into the lungs of the patient.

Fig. 2, A machine for injecting the smoke of tobacco by way of clyster, in those desperate cases which require the application of this remedy. It consists of a pair of bellows, to the muzzle of which is fitted a metal box, *a*, provided with a ring, in the middle of which it may be unscrewed, and again closed, after being filled with tobacco, and set on fire: the pipe *c*, which should be perfectly round and blunt at the top of the flexible tube *b*, is introduced into the fundament; and thus, by means of the bellows *d*, the smoke is forced into the rectum.

Fig. 3, A bier of wicker work, in the form of a slanting, oblong basket, for conveying the body of the drowned, in a posture somewhat raised. This simple contrivance has the advantage, that the water may easily run off, while the patient is carried: and, as many unfortunate persons are materially injured by rough treatment, before they arrive at a house of reception, so that their recovery is thus often frustrated, we recommend the universal adoption of this useful im-

Implements of Restoration from Drowning.

plement. It costs at Hamburgh only ten marks currency, or about 15*s*.

Fig. 4, The *Warming Machine* of block tin, or other metal, was originally invented by Mr. HARVEY, of London, who suggested it to our Royal Humane Society, and it was subsequently improved by M. BRAASCH, an ingenious mechanic, of Hamburgh. Its object is to procure an uniform degree of warmth, throughout the apparatus, in the most expeditious manner, by filling the hollow or double bottom and sides of the whole implement with boiling water....*a* is the body of the machine, seven feet long, and made of solid pieces of block-tin, to prevent the necessity of soldering them, and consequently the formation of iron-rust: it rests on two wooden legs *f f*, and may be easily carried by the handles *g g*. The water is poured in through both funnels *d*, *d*, in order to warm it more speedily; and each of these is provided with a stopper (as represented in the Plate, suspended on a chain), with a view to prevent, if necessary, too sudden evaporation and cooling of the water:....*h* is the intermediate space between the two metallic plates, producing a vacuum of 2 ½ inches, in which the fluid is diffused over the whole machine;....*b* is a wooden desk to support the head of the patient, and to prevent it from the immediate contact with the heated parts; but, on the opposite end of the machine, there is an enlarged intermediate space *c*, for holding such a quantity of water and vapours as will procure an additional, or at least a more permanent, degree of heat towards the lower extremities, than to the trunk of the body. For discharging the water, when it is not wanted, or changing it when too cold, there is a cock at *e*. The hollow sides of this machine are about twelve inches high; and in order to ensure an uniform warmth, the body apparently dead, should be placed on a straw mattress, and tucked in with blankets. A pail-full of water is required to fill the whole machine, as a smaller quantity would warm the sides only for a short time, by means of the vapour.

It deserves to be remarked, that this ingenious contrivance may also be used for a *warm bath;* for which purpose, the inner space in which the body lies, should be supplied with water. The whole apparatus, in its present improved state, made of *copper*, costs at Hamburgh about 200 marks, or from 14 to 15*l.*

Lastly, we cannot conclude this subject, without affording the reader a view of the different articles belonging to a complete chest of instruments, and other materials, employed in the various processes for recovering suspended animation from drowning. The merit of these institutions in England, is due to Drs. COGAN and HAWES, the founders of the Royal Humane Society at London; but the improved arrangement of the chest now to be described, together with the choice of internal and external remedies, were made by one of our most esteemed surgeons, Mr. KITE, in 1788, though considerably extended in 1790, by Mr. REDLICH, a respectable medical practitioner at Hamburgh. This gentleman is likewise one of the most active members of the Humane Society in that city, and has offered the following articles for sixty-five marks, or about four guineas and a half....His complete chest contains:

A small bottle of rectified spirit of wine.
Ditto, white wine vinegar.
Ditto, sweet oil.
Ditto, white French brandy.
Ditto, volatile sal ammoniac.
Ditto, vitriolic æther.
Ditto, mustard-seed.
A machine for injecting the smoke of tobacco.
A leather tube, together with a pair of bellows, for inflating the lungs.
Another tube of leather, for introducing medicines into the stomach.
A small syringe for clearing the throat of mucus.
Three woollen covers, or blankets.
Four brushes and six woollen cloths, for performing friction.
Several emetics.
Two lancets for blood-letting.
One pound of tobacco.
A roller and cushion, to be used in venesection.
Two quills, a sponge, and some lint.
A pocket-knife.
An apparatus for striking fire.
Chamomile and elder-flowers.
Common salt....and a printed copy (in German) of rules and directions for treating the drowned.

Conceiving that a chest containing all these articles could not be purchased in London for less than double the price above stated, beside the additional trouble of procuring them, we have inserted this account; especially as the commercial intercourse between Hamburgh and this country, is daily increasing.

DRUNKENNESS, is that state in which, from the intemperate drinking of liquors, reason has lost its powers, and the person intoxicated is unable to govern himself.

This odious vice is but too prevalent among the lower order of people, who, under the erroneous idea of drowning care, indulge themselves in strong liquors; and by gradually acquiring habits of intemperance, not only undermine their constitution, but also become a disgrace to society.

Drunkenness may be considered as a breach of the law of nature, which directs us to preserve the use of our reason. By the law of this country, it cannot be pleaded as an excuse for committing trespasses and crimes; nay, any person who is found intoxicated, incurs a penalty of five shillings, or, in case of non-payment, is to be set in the stocks. Those who are guilty of it a second time, may be bound in a certain sum for their good behaviour; and, if any alehouse keeper be convicted of the offence, he is liable to be deprived of his license for the term of three years. These are wholesome regulations, and it is sincerely to be wished, that they were more frequently enforced, as well for the benefit of individuals, as on account of the national character. See INTOXICATION.

DRY-ROT, a disease incident to timber, used for building, such as flooring-boards, joists, wainscoting, &c.

Dr. Darwin is of opinion, that the dry-rot may be entirely prevented, by soaking the timber first in lime-water, till it has absorbed as much of it as possible, and, after it has become dry, immersing it in a weak solution of vitriolic acid in water, which he supposes will not only preserve it from decay for many centuries (if it be kept dry), but also render it less inflammable; a circumstance that merits considerable attention in constructing houses.

In the *Transactions of the Society for the Encouragement of Arts*, we meet with the following account of the cause of the dry-rot in timber, and the method of preventing it, communicated by Robert Batson, of Limehouse, Esq. He observes, that the dry-rot having taken place in one of his parlours, to such a degree as to require the pulling down part of the wainscot, every third year; and perceiving that it arose from a damp stagnated air, and from the moisture of the earth, he determined, in the month of June, 1783, to build a narrow closet, next the wall through which the moisture came to the parlour: this expedient had the desired effect. But, though the rot in the parlour was totally stopped, the evil soon appeared in the closet, where fungi of a yellow colour arose in various parts. In the autumn of the year 1786, the closet was locked up about ten weeks: on opening it, numerous excrescences were observed about the lower part; a white mould was spread by a plant resembling a vine, or sea-weed; and the whole of the inside, china, &c. was covered with a fine powder of the colour of brick dust. On cleaning out the closet, it was discovered that the disease had affected the wood so far as to extend through every shelf, and the brackets that supported them. In the beginning of the year 1787, he determined to strip the whole closet of lining and floor, not to leave a particle of the wood behind, and also to dig, and take away, about two feet of the earth in depth, and leave the walls to dry, so as to destroy the roots or seeds of the evil. When, by time, the admission of air, and good brushing, it had become properly dry and cleansed, he filled it of sufficient height for the joists, with anchor-smith's ashes; because no vegetable will grow in them. The joists being sawed off to their proper lengths, and fully prepared, they and the plates were well charred, and laid upon the ashes; particular directions being given, that no scantling or board might be cut or planed in the place, lest any dust or shavings might drop among the ashes. The flooring-boards being very dry, he caused them to be laid close, to prevent the dust getting down, which, perhaps, in the course of time, might bring on vegetation. The framing of the closet was then fixed up, having all the lower pannels let in, to be fastened with buttons only, so that, if any vegetation should arise, the pannels might with ease be taken out, and examined.

In some situations, it might be expedient and necessary to take out a greater depth of earth; and where ashes can be had from a foundery, they may be substituted for those of anchor-smiths; but

house-ashes are by no means to be depended upon.

At the expiration of seven years from the period of making this experiment, the wainscot was removed, and the flooring-boards also taken up, when they were found entirely free from any appearance of the rot: two pieces of wood (yellow fir) which had been driven into the wall as plugs, without being previously *charred*, were alone affected with this disease.

DUCK, the Common Wild, or *Anas boschas*, L. an aquatic fowl, from which the common tame sorts derive their origin.

This bird frequents the lakes of different countries, and feeds upon frogs and several sorts of insects. The wild-ducks pair in the spring; build their nests among rushes near the water, and lay from ten to sixteen eggs. The mallard, or drake, though it varies in colours, always retains the curled feathers of the tail, and both sexes the form of the bill.

Wild-ducks abound particularly in Lincolnshire, where great numbers are taken annually in the *decoys*, which, in that county, are commonly set at a certain rent, from 5 to 20*l.* a year; and there is a decoy in Somersetshire, which is rented at 30*l.* The birds of the former county principally contribute to the supply of the London markets; as surprizing numbers of ducks, widgeons, &c. are annually taken.

The situation proper for a decoy, should be chosen where there is a large pond surrounded with wood, in a marshy and uncultivated country. As soon as the evening sets in, the decoy *rises*, as it is termed, and the wild-fowl feed during the night. This rising is, in Somersetshire, called *roading*. The decoy-ducks are fed with hemp-seed, which is thrown over the screens, in small quantities, to bring them forwards into the *pipes* or canals, and to allure the wild-fowl to follow; this seed being so light as to float.

There are several *pipes* that lead up a narrow ditch, at the extremity of which is a funnel-net.... Over these pipes (which are narrower from their first entrance), is a continued arch of netting suspended on hoops. It is necessary to have a pipe or ditch for almost every wind that may blow; as it depends upon this circumstance to which pipe the birds will resort; and the decoy-man always keeps on the leeward side of the ducks, to prevent his effluvia reaching their sagacious nostrils. Along each pipe, at certain intervals, are placed skreens constructed of reeds, which are so arranged, that it is impossible the wild-fowl should see the decoy-man, before they have passed towards the end of the pipe, where the purse-net is placed. The wild-fowl are induced to go up one of these pipes, because the decoy-ducks, trained to this, lead the way, either after hearing the whistle of the decoy-man, or being enticed by the hemp-seed; they will then dive under water, while the wild-fowl fly on, and are taken in the purse.

It often happens, however, that the wild birds are in such a lethargic state, that they will not follow the decoy-ducks. Recourse is then generally had to a dog trained for the purpose: he passes backwards and forwards between the reed-skreens; this attracts the eye of the wild-fowl, and they advance towards the animal to drive him

away. At length, the decoy-man appears behind a skreen, and the wild-birds not daring to pass by him in return, nor being able to effect their escape upwards, on account of the net-covering, rush on into the purse-net.

Tame ducks are very useful for destroying the black caterpillars, snails, or slugs, which infest turnip fields: hence, if they are turned into such fields, they will devour all the insects, and do no injury to the crop.

It is remarkable, that ducks are extremely fond of the entrails of other animals, and almost every kind of filth. Hence their flesh, though much relished by the epicure, is of a strong alkaline flavour, and not easy of digestion. Those who are afflicted with ulcers, or cutaneous eruptions, as well as invalids and convalescents who are liable to eructations, ought carefully to abstain from this enticing, but hurtful food. If a small quantity of a roasted duck must nevertheless be eaten, it ought to be mixed, during mastication, with a considerable proportion of toasted bread, or biscuits, to absorb and sheath the acrimony which it contains. It is, however, equally absurd and injurious to take drams of spirituous liquors after eating such meat; for, instead of assisting the digestive organs, this momentary stimulus cannot fail ultimately to relax them; hence drinking should for a few minutes be delayed, and afterwards, water or beer may be used, in very small draughts, which will not inundate and weaken the stomach.

[The white back, or canvass-back duck, is more extolled for the delicious flavour of its flesh, than any other of the whole order of water fowl. It breeds in the north and north-west regions of the United States; and arrives on the Atlantic coast, towards the end of autumn. There they remain until the approach of warm weather..... They are not found north of the Chesapeak bay: and are chiefly confined to the waters of the Susquehannah and Potomac. Formerly they were common on James's River, in Virginia, but lately they have deserted it altogether. This abandonment of residence, is supposed to be owing to a failure of the particular food which formerly invited them there. This consists of the roots of a coarse long grass, which grows in the before mentioned rivers, higher toward their sources, than the salt water extends. And these roots which are large, succulent, and resemble those of cellery, are procured by *diving*. So powerful an effect has this food upon them, that one week before they begin to feed on this grass, their flesh is not in the least different from that of common ducks. And whenever ice covers the fresh water of the Susquehannah, and Potowmac, and forces the canvass-backs to leave their feeding place, and go down to the salt water of the Chesapeak, they soon become lean, and their flesh loses all the excellence of relish for which it is so highly prized. *Med. Rep.*

Method of fattening ducks in France.

The ducks are of that kind called in *patois* Mule Ducks, which do not generate, and are produced by the great Indian drake and the common duck. In the autumn when tolerably fat, they are shut up eight by eight in a dark place, and crammed with boiled corn. They sometimes are suffocated, but if they are

soon bled, they are not the worse for it. They pass fifteen days in a state of oppression and suffocation, which makes their livers grow large: when the tail spreads out like a fan, they are fat enough: they are then turned out to bathe, after which they are killed.

Two days after killing, they are opened below, and their wings and legs taken off, and the flesh covering the rump and stomach. The whole is put into a salting tub, with the neck and end of the rump, and left covered with salt for fifteen days; after which they are cut into four quarters and put into the pot. They are first seasoned with cloves and other spices put in them..... Some leaves of Spanish laurel and a little salt-petre having been put in the brine to give the meat a red colour. The salt of Salice is much better than common sea salt; and it is owing to this salt that the hams of Bigorre and Bearn have acquired their reputation.]

DUCK's-MEAT, or *Lemna*, L. a genus of plants consisting of four species, all of which are natives of this country, and grow abundantly in ponds, ditches, and stagnant waters. They are in flower from June to September, and afford a grateful food to ducks and geese, from which circumstance this vegetable has received its name.

In Germany, it is, on account of its various economical uses, often cultivated, by removing the whole plant in pails, and putting it in stagnant waters. When mingled with bran, it affords excellent food for geese and other poultry. In Thuringia, hogs are reared and fattened with a mixture of duck's-meat, bran, and ground barley.... But the most profitable employment of this vegetable, we learn from BECHSTEIN, who informs us, that "from these apparently useless *fibrous roots*, a yarn may be spun, which is equal to that obtained from flax."

Duck's-meat is of a cooling emollient nature, and has therefore been applied to inflammations, erysipelas, or the shingles; and also to the gout, either alone or mixed with barley-meal. Country people sometimes employ it for removing the jaundice: hence they infuse it in white wine, to the quantity of six ounces, to be taken nine days successively, at the end of which period, it is said to have effected a cure.

DUEL, a single combat, on some private occasion or quarrel, in consequence of a challenge.

Taking away the life of a person, by deliberate duelling, is, by the law of this country, a species of murder; and consequently, it charges the crime and inflicts the punishment of homicide on the principals, and likewise, according to the nature of the case, on their seconds. It has also been enacted, that challenges to fight, whether by word or letter, as well as the carrying of such messages, are punishable by fine and imprisonment. And, if they arise from gambling, the offender, by the 9 Anne, c. 14, incurs the forfeiture of all his goods to the Crown, and an imprisonment for five years.

Such, however, has been the prevalence of fashion, that neither the terror of severe penalties, nor any other consideration, have been able to abolish a practice so unjustifiable, and, at the same time, so unbecoming every person who aspires to the character of a rational agent. It must, nevertheless, be acknowledged, that neither duel-

ling with weapons, nor boxing, is in such repute at present as it was a few years since; and we trust, that from the good sense of individuals, and the vigilance of the law, it will in a short time be completely abolished.

DUMBNESS, is the privation, or want, of the faculty of speech.

This unfortunate defect proceeds chiefly from total and native deafness; if it arise from a deficiency in the organs necessary for uttering sounds, it is always incurable. Several instances, however, have occurred of persons born deaf, who have been taught to speak distinctly; to read, write, understand arithmetic, &c.

The most eminent teachers of the dumb in this country, were,

1. Dr. WALLIS, who, in the 61st number of the *Philosophical Transactions*, gives an account of two persons he had taught to speak; and, in the 25th number of the same work, his method is explained.

2. Mr. THOMAS BRAIDWOOD, late of Edinburgh, who is perhaps the first person that ever brought the surprizing art of imparting speech to dumb persons to any degree of perfection. He first commenced his useful labours in 1764, and, in the course of a few years, enabled many to speak, write, &c. We regret that we cannot communicate a clear idea of his method, which indeed will not admit of being so fully explained in writing, as to enable any person to teach it....Mr. B. used to pronounce first the sound of *a*, slowly, at the same time pointing out the figure of that letter, and making his pupil watch the motion of his mouth and throat; he then put his finger into the pupil's mouth, depressing or elevating his tongue, and making him keep the parts in that position. Next, he laid hold of the outside of the wind-pipe, and squeezed it in a certain direction, which we confess ourselves utterly unable to describe. While he was pronouncing the letter *a*, his pupil was anxiously imitating him, uncertain of, or rather not comprehending, the nature of the sound he was required to utter. In this manner, Mr. BRAIDWOOD proceeded, till his tyro learned to pronounce the sounds of the different letters of the alphabet. Mr. B. then continued in the same order to join vowels and consonants, till at length his pupil was enabled both to speak and read.

It would be injustice to omit mentioning the labours of the very ingenious Abbe L'EPEE, of Berlin, who has deservedly acquired great celebrity by his method of teaching dumb persons to speak, by signs or characters. For an account of his plan, we must refer our readers to the "*New Memoirs of the Royal Academy of Sciences*," &c. of Berlin for the year 1795, ("*Nouveaux Memoires de L'Academie Royale*," &c.) in which they will find a short account confirmed by facts.

DUNG, properly signifies the excrements of animals, together with the litter. It likewise comprehends whatever will ferment with soil, such as the green stalks of leaves and plants, when buried in the earth, &c.

The value and use of the dung of most animals, are sufficiently proved by experience. Much, however, depends on adapting the various kinds of dung to different soils, the defects of which are as unlike as the dung employed to

improve them: some lands are too cold, moist, and heavy; others are too light and dry; to ameliorate which, there is hot and light dung, such as that of horses, sheep, pigeons, &c. as also fat and cooling, viz. that of oxen, hogs, and the like.

The quality of the dung of different animals depends in a great measure on the richness, or poverty, of their food. Thus, if cattle be fed on lint, rape, or other oily seeds, it will be of the most fertilizing nature: the dung obtained from those kept on oil-cake, is next in value; then succeeds the manure produced from animals subsisting on turnips, carrots, parsnips, potatoes, or other succulent roots; next in effect, is that resulting from the best *hay*; after which follows that of cattle supplied with *ordinary* hay; and the poorest is that obtained from straw....It deserves to be remarked, that the dung of *fat* animals is unquestionably richer, and consequently contributes more to fertilization, than that of *lean* creatures; which, if worked hard, and fed on straw, "is poor indeed."

In the county of Middlesex, where all the produce of land is sold at very high prices in the markets of the metropolis, the soil is kept in *good heart*, by the immense quantities of dung which are brought in the carts on their return; because no cattle, though fed in home-stalls, can produce fo large a supply. But, in counties that are more remote from London, the most effectual mode of manuring, in the opinion of Mr. Middleton, consists in raising green crops, for the purpose of feeding sheep and bullocks on the land. This, says he, is the only method, by which the loss of nearly all their urine can be prevented: for there is a great waste, equal perhaps to one half, in the stables, cow-houses, sheds, fold-yards, and dung-hills of farms, even though conducted in the most careful manner; but, in those which are under ordinary management, such loss amounts to three-fourths; whereas no waste can possibly arise, when cattle are soiled on tares, clover, &c. in the field; the whole being immediately applied to the amelioration of the land, without incurring the expence of conveyance... We do not pretend to decide on the practicability of this plan; which, in many situations, may be applicable to a considerable extent, and attended with great advantages: on the other hand, we are firmly persuaded, nay convinced from the experience of able and successful farmers on the Continent, that *stall-feeding, with cut hay and straw, is the greatest of all improvements made in modern husbandry.*

Dung possesses two remarkable properties, one of which is to produce a sensible heat, greatly promoting vegetation; the other is, to fatten and render the soil more fertile. The first of these is seldom to be found, unless in the dung of horses, or mules; the great effects of which, when newly made, and somewhat moist, are conspicuous in our kitchen gardens, where it invigorates and gives new life to every plant, supplying the absence of the sun, and affording us all the vegetable delicacies of the spring.

Horse-dung, however, is equally excellent for steril and poor lands; but, if it be used when too new, or be laid on alone, it is to some soils very pernicious; or, if

it be spread too thinly on dry lands during the summer, it proves of very little service ; its fertilizing properties being absorbed by the sun, which renders it little more than a heap of stubble, or dry thatch. Hence, horse-dung is best calculated for cold ground, while that of cows is adapted solely to a hot one : when mixed together, or with mud, both form an excellent manure for either of those soils.

The dung of deer, and sheep, differs but little as to its properties, and is in the estimation of some agriculturists, the most proper for cold clays : with this intention it should be pulverized, and spread thinly over the autumnal or spring crops, in the proportion of four or five loads per acre, in the same manner as ashes, malt-dust, &c. are strewed.

Hog's-dung is supposed to be fatter and richer than that of any other animal ; and has been found to be the most serviceable to apple, pear, and other fruit-trees. It is also particularly excellent for grass, one load of it being said to be more beneficial than two of any other manure.

The dung of pigeons and hens contributes greatly to improve meadow and corn-lands. The former is, without exception, the richest that can be laid on arable soils ; but previously to being used, it ought to be exposed to the air for a short space of time, in order to exhale part of its fiery ingredients. It is, in general, very proper for cold clay-lands, but should be carefully dried before it is spread : being apt, during wet weather, to clod together in lumps....The dung of poultry, is of a heating nature, abounds with salts, and greatly tends to promote vegetation ; it is more speedy in its operations, than that of animals, feeding on the leaves of plants.

Goose-dung is a very valuable and useful manure to the husbandman. Besides its fertilizing properties, when laid on land, the dung of these birds contributes to the fattening of sheep ; and it is a circumstance deserving notice, that cattle, and sheep in particular, are most partial to, and fatten best, on those pastures on which the largest quantity of goose-dung has been dropped.

However excellent dung is from its own nature, it acquires additional vigour, if mixed with lime, in the proportion of one-fourth of the latter to three-fourths of the former. By this means a smaller quantity of manure is consumed ; the seeds of weeds, where this composition is laid on, are effectually destroyed ; and the fermentation of the dung promoted, which consequently heightens its fertilizing properties....See MANURE.

[" The sorts of dung which are, or may be used, are that of black cattle, sheep, horses, swine, goats, hens, pigeons, ducks, geese and rabbits, besides human ordure.

The dung of sheep is more hot and fiery than that of black cattle ; it ferments quicker ; it is fitter therefore for cold, heavy lands. Perhaps the best way of applying the dung of sheep to land is by folding, in countries especially which are not infested by wolves. For in this method their urine is all saved, as well as their dung. But it ought to be turned in with the plough as soon as possible, that the sun and air may not deprive the land of it.

In Flanders it is the practice to house their sheep at night, under slight sheds, the ground being spread with dry sand, about four or five inches thick, laying on a little more fresh every night. This is cleared out once a week, and carried to a dung-hill, or applied to the soil. This mixture of sand and hot dung, makes a very excellent dressing for cold and stiff land. For there is scarcely a richer manure than the dung and urine of sheep. M. Quintinie thinks it the greatest promoter of fruitfulness, in all sorts of ground. This method of folding sheep in a covered fold, and of mixing their dung with earth or sand, according to the nature of the soil it is intended for, is also, with much reason, recommended by Mr. Mortimer; who says, "that he has known vast crops of rye upon barren lands, that have been old warrens, well dunged by rabbits, and large oak and ash trees upon the same, though the soil was very shallow."

Too much can hardly be said in praise of the Flanders method of using sheep's dung. A prodigious quantity of good manure may be thus obtained from a flock of sheep.

If a light soil is intended to be manured with this compost, instead of sand, clay, pond-mud, or the mud of flats may be used, these substances having been first mellowed by the frosts of winter.

Horse-dung is a still hotter manure, as appears by its quick fermentation in heaps, even in cool weather. It is consequently fittest for hot beds, when it is new, and for nourishing those plants which require the greatest degrees of heat. The dung of horses that are fed on grain, is a richer manure than those fed on only grass and hay.

Great care should be taken that horse-dung be not spoiled, by being over heated, or burnt in the heaps, before it is used. For in this country it is very commonly the case. When it has been so heated as to give it a white and mouldy appearance, the virtue of it is gone. It is difficult to give it age, without mixing it with other substances. A mixture of horse and cow-dung is very proper for land that is neither too light nor too stiff.

Mr. Miller says, he has frequently seen new horse-dung buried as it came from the stable, in very cold, moist land, and always observed that the crops have succeeded better than where the ground was dressed with very rotten dung.

The dung of swine is a very rich and fat manure, and so cool as to ferment very slowly. It is so rich and oily, as to be double in value to neats' dung. It will render the most dry and hungry soils exceedingly fruitful in a wettish season, as I have found by experience. It resists the ill effects of drought, and does most service in a hot country. By its steady and gradual supply of a rich nourishment, it is peculiarly adapted for the growing of hops, pumpions, running beans, and every plant which has long vines. Nothing can equal it for the growing of potatoes. This is so strong a manure, that it answers well, when mixed with a large proportion of earth, weeds, straw, or other bibulous substances. It is almost incredible how great a quantity of good manure may be obtained, by supplying a hog-sty with rubbish to mix with the dung. I have heard of 40 loads of manure being made a year by one hog-sty.

"The dung of ducks and geese is deemed too hot and burning.

But if the farmer would gather it in a heap, and mix it with the dung of cattle, he would bring it to a temperate heat, and draw from it such advantage as would indemnify him for the pains he should take. The virtue of this method is known by experience. A farmer having abandoned a piece of ground to his geese for twelve years, afterwards turned them out to let the grass grow, and it rose so thick and strong that a scythe would scarcely pass through it. Hen-dung is scattered in small quantities upon land intended to be sown, but on account of its heat it is never used, unless when rain is foreseen. It is an excellent manure for meadows..... Pigeon's dung is much the same with that of poultry, the only difference being its superior heat." *Scots Farmer.*

I should think it better to mix the dung of poultry and pigeons with other substances, to allay their heat, before they are applied to the soil. And thus qualified, they would be an excellent top-dressing for corn, especially in cold and wet lands.

Human ordure is a very fat and hot manure, full of fertilizing salts; and therefore extremely proper for all cold, sour soils; especially if it be mixed with other dung, straw or earth, to give it a fermentation, and render it convenient for carriage. Some do not like the use of it, on account of its bad smell; and others imagine, that it gives a fetid taste to plants. But in this they seem to carry their delicacy too far. Mr. Bradley says, "it is kept in pits made on purpose, in foreign countries, till it be one, two, three, or four years old: That of four years old is accounted the best, that of three years tolerable. Perhaps it may owe great part of its richness to the urine with which it is mixed; for though the human urine be destructive to vegetables, whilst it is new, by reason of its burning sal-ammoniacal spirit, as Glauber terms it, yet time will digest the urine, and render it an extraordinary fetilizer of every kind of soil." *Complete Farmer.*

As dung in general is so important a manure, every possible method should be taken to prevent its being wasted, as indeed a great proportion of it is by the common management of our farmers. In no way is it more wasted, than by its being too much exposed to the sun, air, and rains. Mixing of dry earth, or other absorbent substances, with heaps of dung, will do much towards preventing this loss. Or slight sheds may be made over them, to prevent their strength being too much wasted by heavy rains; and at the same time, to prevent a too great exhalation from them. Some cover them with turfs, when they choose to keep dung till it be old. This is not a bad practice; for the turfs in that situation will become good manure. I would hope farmers need not be told, that the grassy side should be laid on the dung.

Some build cellars under their barns, and throw the dung through scuttles down into them, to keep it from the weather. This is a far more expensive method than what I have recommended. For it is necessary in order to save the manure, that the cellar wall be well pointed; and also that a hard under stratum form the floor, or that a tight artificial floor be made. The dung in this situation will mellow the faster, for not being exposed to any severe frost. And a cellar may be so contrived, that a cart may be driven in at one end, and out at the

other, which may render the removing it easy. I wish not to discourage any who are willing to put themselves to the expense that attends this method.

Some caution should be observed, that the strength of dung may not be diminished by shoveling and carting it in weather that is hot, dry and windy. If it be performed when the weather is calm and cloudy, its volatile parts will not evaporate, in any considerable degree.

When it needs fermenting in the field before spreading, or putting into holes, which is the case of new dung carted from large heaps, the small heaps in the field should be thinly covered with a little earth. It will not hinder the fermentation, but will prevent its evaporation.

When the farmer has carted his dung-heaps away from the sides of his barn, he should take up an inch or two of the surface of the ground beneath; because much of the strength of the dung and stale has passed into it, and made it a good manure.

When dung is applied to tillage-land by folding, it should be mixed with the soil, by the plough or the harrow, every two or three days, if the weather be dry. Or it may be done with the hoe or shovel. In cloudy or rainy weather, it will not need mixing so often. If this method be observed, much will be saved: And half the time that yards are commonly folded, will, if I mistake not, be sufficient to fit them to produce a good crop.

Our farmers seem to think it a matter of great importance to put dung in holes under the seed, especially to produce a crop of Indian-corn. Nothing makes this tedious and laborious method needful, unless it be a scarcity of manure, as less will answer for one single crop, than is required in the other way. The corn does not commonly come up so well, and it is more in danger of being destroyed by worms. If six or eight loads of dung will cause an acre to produce more corn when put in holes, than if it were ploughed in, as it undoubtedly will; yet it should be remembered, the land will not be in so good heart the year following; will not produce so good a crop of grain, nor be in so good order to lay down to grass. So that perhaps, in a course of crops, it may be found that the labour of dunging in the holes may be spared, excepting, perhaps, in green sward ground. If so, the farmer might redeem time by it, and at a season when his hurry of business is greatest.

I may add that new dung is not so suitable to put in holes, as that which has lain a year in heaps. But it has more virtue, and will add more strength to the soil; for it is next to impossible to keep dung till it is old without some waste. And this may afford another good reason for laying aside the practice of dunging in holes. *N. E. Farmer.*]

Dung-hills, or *Dung-meers*, in husbandry, are places, where soil or dung is collected, mixed with other putrefactive ingredients, and left to digest together. For this purpose, the usual practice is, to dig a pit of sufficient depth to contain the stock of soil which the husbandman may be able to collect. Into this pit are thrown the refuse of fodder, litter, dung, weeds, &c. which lie there, and rot, till the farmer may have occasion to make use of the compost. Dr. Darwin, however, proposes to place the heap of manure or dung on a

gently-rising eminence, with a bason beneath, in order that the superfluous water, which would otherwise prevent the fermentation of the straw, may drain off, and be collected. He adds, that some earth, weeds, leaves, saw-dust, or other vegetable or animal recrement, should be thrown into the bason, which will thus promote the fermentation and putrefaction of the substances it contains, while the draining from the dung-heap will not be dissipated.

This, doubtless, is a more rational plan of constructing dung-hills, as the alkaline liquor thus collected, may farther be advantageously employed, for steeping wheat, or other seed-corn; which, in consequence of such saturation, will vegetate more luxuriantly, and yield a more abundant harvest.

The following judicious method of raising dung-hills, is practised in the county of Middlesex: it justly claims the attention of those farmers, who find it necessary to collect dung, for the use of their lands....First, all the scrapings of roads, the mud of ponds and ditches, and the top-mould from gravel-pits, are spread in the most convenient places, as *bottoms for dung-hills*. On these strata is carted the whole of the dung, produced on their own farms, together with all that can be procured from the metropolis, and the different inns on the road; to which are sometimes added chalk, ashes, soap-boilers' waste, brick-layer's rubbish, &c.

In this state, the heap remains till within a month of the time for spreading manure on the land; when the whole is turned, and intimately mixed; the larger clods are then broken into small pieces, while such as may be too dry, are thrown into the middle. Thus treated, the mass unites more perfectly; and the putrefaction will be completed, while the matters continue in a heap. By this mode of forming the basis of dung-hills, the fertilizing liquor (that distills from the dung during the fermentation and heat which necessarily take place) is effectually preserved, and contributes greatly to the amelioration of the soil.

[Dunghills may be tended, and augmented at odd times, when no other business stands in the way. That at the back-door especially may be very easily made up, of a variety of rich and fertilizing ingredients, besides dung; such as the scrapings of the yard after rain; soot and ashes; shells, lime and bones; the sweepings of the kitchen; oil dregs, and any fat things; woollen rags; bloody water, in which meat or fish has been washed; greasy water; suds; ashes, although the ley has been drawn from them; old useless brine; urine; and in short, any animal or even vegetable substance that has not too much acid. Or even acids, if they be over balanced by plenty of alkaline substances.

To prevent the heaps being too much torn and spread about by swine, or by the scratching of dung-hill fowls, the heaps may be included in pens made with wide boards; or some rocks may be laid round them, to prevent their evaporating; as well as under them, to prevent their soaking into the earth.

The heaps should have such a degree of moisture as best promotes fermentation and corruption. A cavity may be made close to the lower side of the heap, to receive the superfluous moisture as

it runs from it, after rain; and this liquid, highly impregnated with the strength of the manure, should be thrown from time to time, on the top of the heaps with a scooping shovel. In a wet season, the heaps will need some slight sheds over them.

Heaps about the barn or cow-yard, may be augmented with some of the nearest earth, swamp-mud, straw, weeds, &c. those of the hog-sty with the same, together with the dung of fowls, or other hot manures, as the dung of swine is naturally cold.....But the farmer should acquaint himself with the nature of the different manures; and always let that ingredient in his heaps be predominant, which is best adapted to correct and meliorate the soil on which it is to be laid. If it be destined for a sandy soil, clay will be an excellent ingredient in the composition of the heaps. If it be designed to lay on a clayey soil, sand is proper.

The heaps will not ferment so fast as they ought, unless they be shoveled over once or twice in a summer. By such operations they will be more thoroughly mixed and mellowed, and the sooner be fit for use. The seeds of weeds in them will vegetate, and be destroyed....*N. E. Farmer.*]

DWALE: See Deadly NIGHTSHADE.

DWARF-TREES, a kind of diminutive fruit-trees, frequently planted in the borders of gardens, and so denominated from their low stature.

Dwarf-trees were formerly in great request, but have been much neglected since the introduction of espaliers. The method of propagating *dwarf-pears*, which have been found to succeed better than any other dwarfs, is as follows: They are to be grafted on a quince-stock, about six inches above the ground; and, as soon as the bud has sprouted so far as to have four eyes, it is to be stopped, in order that lateral branches may shoot forth. Two years after budding, the trees will be ready to be transplanted to the spot where they are to remain. They should be set at the distance of 25 or 30 feet square, and the intermediate space may be sown or planted with culinary herbs, while the trees are young; but such herbs are not to be placed too near their roots, which would thus be obstructed in their growth. Stakes are next to be driven around the tree, to which the branches of it are to be nailed with list, while young: being trained in an horizontal direction, and no branches being afterwards permitted to intersect each other: in shortening the roots, the uppermost eye should always be left outwards. The summer and autumn pears thrive most luxuriantly, when planted in this manner, but the winter pears do not succeed.

Apples are also sometimes cultivated as dwarfs; for which purpose they are generally grafted on paradise stocks. These do not spread their branches so widely as pears, and therefore require to be set only 8 feet apart. Some gardeners also rear dwarf-apricots and plums, which, however, being less handy than either apples or pears, seldom thrive when set according to this method.

DWARF-BAY: See MEZEREON.

DWAY-BERRIES: See Deadly NIGHTSHADE.

DYEING, generally signifies, the art of tinging cloth, stuff, or other matter, with a permanent

colour, by penetrating its substance. It is, however, usually confined to the art of imparting different colours to wool, silk, linen, and cloth.

The materials for dyeing are so various and numerous, that our limits oblige us to be concise. The same difference, indeed, prevails among the dyeing, as among the colouring matters. Some ingredients produce durable colours, which cannot be discharged, either by exposure to air, or by washing with soap. Others, though they may withstand the action of soap, cannot resist that of the air. These are distinguished by the different appellations of *true* and *false*, *permanent* and *fading*, &c.; nor has any method been hitherto discovered, of imparting to *false* colours a durability, equal to that of the true ones.

This object has often been attempted, by combining a permanent with a fading colour, in the expectation that the former would communicate some portion of its durability to the latter; which nevertheless uniformly faded, leaving the cloth dyed with the permanent colour. In some cases, however, which have been already explained, the volatile colour imparts its property to that which would otherwise continue in a fixed state. A solution of tin in *aqua regia* will, it is affirmed, give to many of the fading colours a high degree of beauty, and some portion of durability, though much inferior to the others.

The most *permanent* dyes we have, are cochineal and gum-lac, for fine red and scarlet colours; indigo and woad, for blue; and, when mixed with different proportions of cochineal, or gum-lac, for purple and violet colours. Dyers-weed, and some other vegetables, for yellow; and madder for coarse reds, purples, and blacks. The *fading* colours are far more numerous, and include Brazil-wood, logwood, red-wood, fustic, turmeric-root, anotto, archil, &c.

The whole of the operative part of dyeing depends on the application of certain colours, which the workmen call *primitive*, and which are five in number, namely, *blue*, *red*, *yellow*, *fawn*, or root-colour, and *black*. Each of these furnishes a variety of intermediate shades, both according to the nature of the ingredients, and the acid or alkaline substances with which they are mixed. Two only of these five colours, should be prepared with ingredients producing no colour of themselves; but which, by their peculiar acidity, and the fineness of the earth they contain, dispose the pores of the substance to receive the dye. The colours which more particularly require such auxiliary process, are red and yellow, together with those derived from them. Black is obtained by a particular preparation; but blue and fawn colour require none, at least for wool; it being only necessary to scour and soak this substance well; then to immerse it in the dyeing vat, stirring it well about, and permitting it to remain for a longer or shorter time, in proportion as the colour is intended to be more or less deep....The ingredients used in dyeing *blue* consist of pastel, woad, and indigo.

1. PASTEL (*Isatis tinctoria*), is prepared by gathering it when ripe, suffering it to rot, and then working it up into balls for drying; which weigh in general from 150 to 200 pounds, and resemble a

collection of small dry lumps of earth, intermixed with the fibres of plants. In order to extract the colour, it is necessary to provide large wooden vats, from 12 to 16 feet in diameter, and 6 or 7 feet high, or of a magnitude proportioned to the quantity intended to be used. The preparation of the blue-vat is the most difficult process in the art of dyeing; and the practical directions given by those who understand it, are either defective, or mis-stated. The copper-cauldron should be placed as near to the vat as possible, and filled with pond-water; to which if it be not sufficiently putrid, may be added 2 or 3 pounds of hay, together with 8 pounds of brown madder, or of the bark of the root. The fire should be lighted about three o'clock in the morning, and the mixture boil for an hour and a half, or two hours, when the liquor is, by means of a spout, conveyed into the vat, in which a peck of wheaten bran is previously infused. The pastel-balls are next to be put in, separately, while the liquor is running into the vat, in order that they may be the more easily broken and stirred with the rake, which is a semi-circular wooden instrument, having a long handle. The mixture is occasionally agitated, till the vat has received all the hot liquor; and, as soon as the vessel is nearly half full, it should be covered with a lid, somewhat larger than its own circumference. A cloth should be likewise thrown over it, in order to confine the heat; after which the whole should be suffered to subside for four hours; when it ought to be uncovered, in order to give it air, and to mix it thoroughly. No *lime*, as is generally, though falsely directed by dyers, should be put into the vat, but a small air-hole left on the top: the stirring and agitation may once more be repeated, at the expiration of three or four hours.

If the ingredients, after these operations, be not yet ready and *come to*, that is, if the blue does not rise to the surface, but continues to foam, it will then be necessary, after working the mixture well, to let it stand an hour and a half longer; care being taken during that time to observe it minutely, in case it should *cast blue*. The vat is then to be filled up with water, and a sufficient quantity of indigo, dissolved in a ley of pot-ash, pure water, bran and madder. The vat being again covered, at the end of three hours a pattern is to be immersed in the liquor for a similar space of time, when it is to be taken out, to inspect the state of the vat. This pattern, when first taken out, should be of a green colour, but instantly turn blue; if the green be bright and good, the vat is to be stirred again, and then covered up, with the addition of a few handfuls of bran. Three hours after, the same operation is to be repeated, with the addition of more bran, if necessary, when it is to be covered up for an hour and a half longer; and, as soon as it subsides, another specimen is to be immersed in it for an hour, when it must be examined, to ascertain the state of the pastel. If the former be of a good green, when taken out, and turn suddenly to a deep blue, on being exposed to the air, another pattern is to be put in, to discover the effect of the vat; which, if the colour be sufficiently high, is to be

filled with hot water, or (which is preferable, if it can be procured), with the liquor of an old madder-vat, and then stirred again. Now the vat is to be once more covered for an hour; after which the stuffs to be dyed should be immersed.

Woad is the next article in the making of a blue colour: the mode of preparing it differs in no respect from the preceding one, just described, excepting that it is weaker, and yields less colour.

Indigo is the last ingredient in dyeing blues. The vat is about 5 feet high, two inches in diameter, and somewhat narrower towards the bottom, being surrounded by a wall, and having a vacancy for the embers. A vat of this size requires from 2 to 5, or even 6lbs. of indigo; and this operation is conducted as follows: 1. About 15 gallons of river water are put into a copper to boil for about half an hour, together with 2lbs. of pot-ash, 2 oz. of madder, and a handful of bran. 2. Immerse 2lbs. of indigo in a pail of cold water, in order to separate the solid from the volatile particles, which will immediately rise to the surface. The watery liquor is then poured off, and the indigo, settled at the bottom of the pail, should be triturated in an iron mortar, with the addition of a small quantity of hot water, that ought to be shaken from side to side; and the floating particles of indigo, which are those most finely pounded, must be poured into another vessel. In this manner, the indigo remaining in the mortar is continually reduced, fresh water being repeatedly added, till the whole is pulverized so finely as to rise to the surface.

The liquor which had, during the above stated preparation, been boiling in the copper, is now poured into the vat, together with the indigo, when the whole is well stirred with a rake, the vat closely covered, and surrounded with embers. If this operation commence in the afternoon, the embers must be renewed in the evening, and also in the morning and evening of the following day, in the course of which it should be twice gently stirred. Similar measures ought to be pursued on the third day, in order to preserve an uniform heat, and intimately mix the ingredients. A brassy scum will then be perceived to rise to the surface, in several detached parts: by continuing the heat on the fourth day, the scum becomes more coherent; and the froth, occasioned by stirring the liquor, appears blue, while the latter is of a deep green. As soon as it assumes this appearance, the vat should be filled; for which purpose a fresh liquor must be prepared, by putting five gallons of water into a copper, together with a pound of pot-ash, and half an oz. of madder. When these ingredients have boiled half an hour, the decoction is poured into the vat, the whole well stirred, and, if it produce much froth, it will be in a proper state for working the next day. This may likewise be ascertained by the brassy or scaly crust, which floats on the surface of the liquor; and, farther, if on blowing, or stirring, the latter with the hand, it assume a deep green colour, while the surface appears of a brownish blue.

After the vats have been thus prepared, the dyeing of woollen or silken stuffs is very easy; no other process being required, than immersing them in warm water, wringing, and then steeping them in the vat for a longer or shorter

time, according to the deepness of the colour intended to be imparted. The stuffs should be occasionally opened, that is, taken out of the vat, wrung over it, and exposed to the air for a minute or two, till it become blue: for it must be observed, that, in all the solutions of indigo, or other dyeing materials above described, the blue colour is produced only by exposure to the air, and the stuff, on being first drawn out of the liquor, always appears green, and will retain that tinge, unless it be exposed to the air. In dyeing blue, therefore, it is necessary to let the colour thus change previously to a second immersion, that the shade may be the better distinguished, as dark blues require to be repeatedly dipped.... The method of dyeing cotton or linen blue, varies so little from that already described, as to render any farther directions unnecessary.

A beautiful *Saxon-blue*, for silk and woollen cloths, may be prepared by gradually pouring from five to eight parts of sulphuric acid on one part of finely pulverized indigo. The mixture must be suffered to stand for 24 hours; at the expiration of which, the effervescence will subside; the solution is then to be diluted with water, when it will be fit for dyeing.

2. The next of the primitive colours to be considered is RED, of which there are many shades and varieties; but the principal are scarlet, crimson, and madder red. The process to be adopted for obtaining these colours, essentially differs from that of blues; as the former require a peculiar preparation of the stuffs to be dyed, on the exactness of which, the goodness of the colour in a great measure depends. These preparatory ingredients consist of alum, tartar, aqua-fortis, or a solution of tin in this acid. Galls and alkaline salts are also sometimes added, though they do not materially contribute to the colour.

A fine *orange-yellow* tinge may be imparted to silk or cotton, by grinding anotta on a moistened slab, and boiling it in double its weight of pearl-ash and water: the liquor is then suffered to settle for about half an hour; when it is drawn off, while hot, into a proper vat; and the stuff immersed, till it acquire the requisite shade. In order to heighten and fix the colour, it will be proper to dissolve some cream of tartar in hot water, and to add the solution to the liquor, so as to render it slightly acid: after which, the stuff may be rinsed, and dried in the usual manner.

There are three kinds of *scarlet*, namely, that dyed with *kermes*, with *cochineal*, and with *gum-lac*.

The first of these, called *Venetian scarlet*, is the most permanent, but the least bright: it is also apt to be less spotted than the others; but, on account of the difficulty of procuring the insects which afford the colour, it is very seldom, if ever, used in this country.

The second kind of scarlet, namely, that dyed with *cochineal*, is less permanent than the Venetian scarlet, though the drug is procured at a more reasonable price. It is, however, very difficult to dye the true cochineal scarlet: the success of this operation equally depends upon the choice of the material, the water employed, and the method of preparing a solution of tin, which is the only ingredient by which that delicate colour can be produced. To eight ounces of spirit of nitre, an equal quantity of

river-water is to be added; in this mixture are to be gradually dissolved, half an ounce of the purest and whitest sal-ammoniac, and two drams of purified salt-petre. An ounce of tin, reduced to grains, by being dropped into cold water while melting, is next to be added drop by drop to the liquor thus prepared; the first being perfectly dissolved before a second is introduced. The solution resembles that of gold, and, if fine tin be employed, will be perfectly transparent, without any dust or sediment. With this liquor are to be mixed such proportions of cochineal as may be thought proper, and the stuffs dyed in the colour will acquire a most beautiful scarlet.

The scarlet produced by *gum-lac* though not so bright as cochineal, is more permanent; the best lac is that which is of a blackish brown colour on the outside, and white within. The process of preparing this colour is very difficult; but the best method, we believe, is that of previously mixing the gum with comfrey, or other mucilaginous roots. These should be dried, finely pulverized, afterwards boiled for fifteen minutes in the proportion of half a dram to a quart of water, then strained through a linen cloth while hot, poured upon levigated gum-lac, and passed through a hair-sieve. The whole is then digested in a moderate heat for twelve hours; and the gum remaining at the bottom should be stirred seven or eight times. The liquor thus impregnated with a fine crimson colour, is afterwards poured into a vessel, sufficiently capacious to hold four times the quantity, and filled up with cold water. On adding a small proportion of a strong solution of alum, the coloured mucilage subsides; and, should any tinge remain in the liquor, it may be precipitated by gradual additions of alum, till it become perfectly colourless. As soon as the crimson mucilage has entirely subsided, the clear water must be carefully decanted, the remainder filtered, and the fluid parts suffered to evaporate. If the whole of the colour should not be extracted by the first operation, it ought to be repeated, till the residuum changes to a pale straw-colour.

In order to dye scarlet with this extract of gum-lac, the requisite proportion of the latter dried and pulverized, is to be put into an earthen or block-tin vessel; a little hot water poured upon it; and, when it is well moistened, a proper quantity of the composition added; the whole being stirred with a glass pestle. By this means the powder, which before was of a dark, dusky purple, acquires an exceedingly bright scarlet colour. A solution of the crystals of tartar is then to be poured into the liquor, and as soon as it begins to boil, the cloth is to be repeatedly immersed in it, according to the common method. The remainder of the operation is to be performed in the same manner as if cochineal had been employed.

Crimson is the colour produced by cochineal, with alum and tartar only, without any solution of tin. For this dye, two ounces and a half of alum, with an ounce and a half of white tartar, are to be taken, for every pound of wool; and being put into a cauldron with a proper quantity of water, the solution should boil before the stuff is dipped. The wool is then immersed into the boiling liquor, where it continues two hours; after which

it is to be taken out, wrung gently, rinsed in water, and put into a bag. A fresh liquor is next prepared for the dye, in which an ounce of finely-powdered cochineal is used for every pound of wool: when this decoction boils, the stuff is immersed, and managed in the manner already directed for scarlet. For producing the finest crimson dye, however, the wool is again to be dipped in a weak lixivium, made of equal parts of sal ammoniac and pearl-ashes.

The preparation of the ingredients for *madder*-red is always with alum and tartar, the proportions of which are by no means ascertained even by dyers. The more general practice is, to put 5 ounces of alum and one of red tartar to every pound of worsted, a twelfth part of acid water being likewise added, and the wool boiled for two hours in this solution, in which worsted is to be kept for a week; but cloth will be sufficiently saturated in four days. A fresh liquor is then prepared for dyeing this wool; and when the water is nearly boiling, half a pound of the finest madder is to be thrown in for every pound of wool; being carefully stirred and well mixed in the copper, previously to immersing the stuff, which is to be kept in the liquor for an hour; during which the latter must not boil, lest it should tarnish the colour.

The third primitive colour is YELLOW, for obtaining which there are ten different ingredients; but four of these only yield a good and permanent dye, namely, dyers'-weed, or, as the dyers call it, weld, savory, dyers' green-weed, and fenu-greek. The first of these, namely, *weld*, in general affords the truest yellow, and is therefore preferred to all the others. Savory and dyers' green-weed, being naturally somewhat green, are more advantageously employed for dyeing that colour; and the last yields different shades of yellow.

In order to dye worsted and stuffs yellow, they undergo the usual preparation with tartar and alum: of the latter 4 ounces are allowed to every pound of wool, or 25 lbs. to every 100; of the former, one ounce is sufficient for yellow; after dissolving both, the wool is boiled in the same manner as in the preceding colour. A fresh liquor is next to be made for the *welding* or *yellowing*, in the proportion of 5 or 6 lbs. of dyers'-weed to every pound of stuff. Some inclose the drug in a clean woollen bag, to prevent it from mixing with the cloth to be dyed; and, in order to keep the bag down in the copper they lay a cross of heavy wood over it. Others boil the weld in the liquor, till the water has imbibed all its colour, and the drug sinks to the bottom, when the stuff is suspended in a net: others, again, take the weld out, as soon as it is boiled. According to the shade required, other vegetables are occasionally mixed with that drug. By varying the proportion of the salts employed, as well as the quantity of colouring ingredients, and the time of boiling, different shades may be produced.

The fourth primitive colour is that denominated by dyers the FAWN, or *root* colour. It is a kind of brown, and the process for dyeing it is widely different from those just described; the wool merely requiring a simple immersion in water, as already directed for blue. The materials employed consist of

the green shell of the walnut, the root of the walnut-tree, the bark of alder, santal or saunders-wood, sumach, and soot....The green walnut-shells are collected, when the nuts are thoroughly ripe; they are put into tubs or casks, which are afterwards filled with water, and are thus preserved till the succeeding year.

Santal, or saunders-wood, is much inferior to walnut-shells; because, if used in too large a quantity, it stiffens and consequently injures the wool. It is in general mixed with galls, sumach, and alder-bark, without which its colour could not be extracted: and though it yields very little with alum and tartar, it is nevertheless used in large quantities, on account of the solidity of its colour, which is naturally a yellow-reddish brown.

The best of the different ingredients employed in dyeing fawn-colours, is the bark or rind of the walnut tree. Its shades are uncommonly fine; its colours solid; and it renders the wool dyed in it flexible and soft. A cauldron half full of water is placed over the fire; and as soon as it grows warm, bark is added in proportion to the quantity of stuffs intended to be dyed, and the lightness or depth of the shades required. It is then boiled for about a quarter of an hour, when the cloths, being previously moistened with warm water, are immersed, frequently turned, and well stirred, till they have sufficiently imbibed the colour. They are aired, dried, and dressed in the usual manner.

Next to the rind or bark, the root of the walnut-tree is the best dye for a fawn-colour: it also affords a variety of shades, similar to those produced by the bark, for which it is frequently substituted. The root, however requires a different process: A cauldron is filled about three parts full of river-water, into which the root is immersed, after being tied up in a bag. When the liquor is very hot, the wool or stuff is plunged into it, repeatedly turned, and occasionally aired. The lighter stuffs are next to be dipped, till the colour is completely extracted. During this operation, proper care should be taken to prevent the liquor from boiling, as in such case the piece first immersed would imbibe the whole of the colour.

The process of dyeing with the bark of *alder*, is nearly the same as that pursued with walnut-roots: the boiling of it is at first not very material, as this drug very freely communicates its colour. It is chiefly used for worsteds, imparting shades darkened with copperas; and for wool that is not required to be very dark, as it equally withstands the effects of the sun and rain.

Sumach possesses nearly the same properties as the bark or rind of the walnut-tree; its colour is not so deep, somewhat inclining to green, but is solid and permanent. Where dark colours are required, sumach is frequently substituted for nutgalls, in which case a greater proportion becomes necessary. ....These different substances, however, are not unfrequently mingled together, and, as they are of a similar nature, and differ only in degree, it is easy to obtain various shades.

With respect to the method of compounding the different ingredients with pulverized *saunders-*

wood; 4 lbs. of the latter are to be put into a copper, with half a pound of powdered nut-galls, 12 lbs. of alder-bark, and 10 lbs. of sumach. The whole is to be boiled, when a small portion of water should be added, to check the boiling: after immersing the cloth, stirring, and turning it repeatedly, it is aired, and washed in river-water. The quantities of these ingredients may be increased, or diminished, according to the depth of the shade required.

The last substance employed in dyeing the fawn-colour, is *soot*, which is not only less solid than the others, but also hardens, and imparts a very disagreeable smell to the wool, or stuff, dyed in it: it is therefore seldom, if ever used, unless the other ingredients cannot be easily procured.

The fifth, and last, of the primitive colours, is BLACK, which includes a great variety of shades. In order to impart a good black to woollen stuffs, they should be first dyed of as deep a blue as possible, which is called the *ground*, and is to be performed in the manner already directed. As soon as the cloth is taken out of the vat, it ought to be well washed in river-water, and afterwards scoured at the fulling-mill. Next, the dyeing process is performed as follows: For every cwt. of cloth, 10 lbs. of logwood cut into chips, and an equal quantity of Aleppo gall-nuts pulverized and inclosed in a bag, are to be put into a cauldron of a moderate size, where the whole is boiled for twelve hours in a sufficient quantity of water. A third part of this liquor is then to be poured into another cauldron, with 2 lbs. of verdigrease, when the cloth is to be immersed for two hours, being repeatedly turned and stirred, the liquor in the mean time boiling very slowly, or rather, gently simmering. At the expiration of that time, the stuff is to be taken out, and the second part (being another third) of the liquor added to the first third, together with 8 lbs. of copperas. The fire beneath the cauldron is then to be diminished, and the copperas left for half an hour to dissolve; the liquor being gradually cooling: after which the cloth is to be immersed for another hour, repeatedly turned as before, then removed and cooled.

The remainder of the liquor is next to be mixed with the first two-thirds and the bag carefully expressed; when fifteen or twenty pounds of sumach are to be added, together with two pounds of copperas. The whole is then made to boil; and, a small quantity of water being added to cool, the stuff is again immersed for two hours; at the end of which time it is to be taken out, cooled, and steeped in the dye for an hour longer, being frequently turned. The cloth is then to be carried to the fulling-mill, and well scoured, till the water runs from it perfectly colourless. As soon as this operation is performed, a fresh liquor should be prepared with the necessary quantity of dyer's-weed, which is only once to be boiled, and when cool, the cloth dipped into it. This last decoction softens the texture, and renders the colour a most beautiful black. Few dyers, however, take so much pains; for they are satisfied with dipping the cloth, when blue, in a decoction of nut-galls and boiling the whole for two hours. The stuff is then washed, and after adding some copperas and

logwood to the liquor, the cloth is again immersed for two hours, at the end of which it is washed, scoured, dried, and pressed.

A hot decoction of Aleppo galls, in water, is first to be prepared in a proper vessel, in which cotton or silk stuffs, previously soaked in warm water, must be worked for some time. The superfluous liquid is now to be expressed, and the cloths should be immersed in a black dye, made by steeping alder-bark, and iron hoops for several months, in a cask of water; or they may be plunged into a solution of iron in vegetable acids. When the stuffs are thoroughly wetted, they must be wrung out, and afterwards soaked in a decoction of logwood, to which a little verdigrease is added. The last mentioned process ought to be repeated, till the colouring particles be sufficiently imbibed: during the intervals, it will be proper to rinse the cloths in water, and to dry them, in order to fix the colour.

[The art of dyeing consists of three operations, viz.: Fully to cleanse the substance which is to be dyed, and to remove all foreign matters which might prevent it from taking the colour. 2. To dispose it by particular compositions to receive and retain the colouring principle, and 3. To prepare the bath of colour in which it is to be immersed, and to work it according to the rules of the art.

The article dyeing is left as Dr. WILLICH has inserted it, but it conveys little information, and that little is inaccurate. At present *gum lac* and kermes are no part of a dyer's establishment. To give all the processes for dyeing different colours and shades of colours, would of itself occupy a large work. The following sketch communicated by Mr. Cooper, of Northumberland, may be useful.

Substances to be dyed are, silk, woollen, cotton, linen, and skins. Of these, some have more affinity to the colouring matter of vegetables than others, as silk, and woollen, more than cotton or linen. But this affinity is in all cases increased by the intermedium of the earth of alum, or the calces of iron and tin. The compositions in which these enter, when applied to the cloth are termed *mordants*, and they serve as the basis on which the colours stick and are fixed. Thus, if without preparation, a piece of linsey-wolsey be boiled in a decoction of madder or weld, the linen will come out white, the woollen part will be tinged. If part of a piece of cloth be run through a hot solution of alum, it will take a deeper and more permanent dye than the part not so treated.

The *mordants*, then, in common use, are *alum*, iron liquor, which is iron in the acid of vinegar, and *tin* in the nitro-muriatic acid, or aqua regia. Alum is bought every where ready prepared. Iron liquor is made by putting old iron into beer brewed on purpose, or any other mode of obtaining the acetous acid. It is left to stand in the cask and repeatedly drawn off and poured in again for 6 months. In England it is a trade to make it, though till of late years every dyer made it for himself. The mordant of tin is made thus, to two parts of aqua fortis add three parts of spirit of salt, dilute it with an equal bulk of water: add small pieces of grain tin, till no more be dissolved. Put in but one small piece at a time. The principles of dyeing silk and woollen are much alike. Those

who would dye silk, may peruse to advantage MACQUER's treatise on this subject, and the art of dyeing wool by HELLOT is also translated into English under the title of the *Art of Dyeing*. The work of BERTHOLLOT on dyeing is by far the most scientific yet produced; but none of them are accurate as to the actual processes.

The *mordants* are always kept ready in a dye-house, in a concentrated state, ready to be diluted as occasion may require; the strength of the colour until it arrives at its maximum, depending on the compound ratio of the strength of the mordant and the quantity of the colouring drug. In the following general recipes, I cannot give the exact proportions, because they vary with every shade of colour, and with the quality of the drugs: but a little experience in the dye-house, will teach the method of proceeding.

The processes immediately following, are calculated for woollen or silk. It is to be noted, that, in all the colours dyed on woollen, where the mordant is the earth of alum, the dyers use *white* or *red argol*, or the tartar of white or red wine. This is usually supposed to brighten the colour, by means of the acid contained in it, but the real effect is to produce a solution of the earth of alum in the acid of tartar by double decomposition. The proportions used are, 2 parts alum and 1 part tartar, which latter might be increased with advantage.

Scarlet and Crimson. Immerse the woollen for an hour in a hot liquor composed of about ½ a pint of the solution of tin to a gallon of water: then for another hour in a hot (not boiling) solution of cochineal: repeat it till you get your colour: brighten it by running it through the tin liquor of half the above strength. A slight alkaline solution will give it a crimson cast.

Some dye it first with alum liquor made with argol, in the proportion of a quart to the gallon, and then in a bath, or decoction of brazil wood to the amount of ¼ of a lb. to the one pound of woollen. Then use the alum solution, and then the cochineal, and brighten finally with the tin liquor.

Purple. Add to the mordant of tin, about ¼ of a pint, or less, of a solution of iron in common aquafortis, and proceed as above. This gives according to the proportions of the mordant, all the shades of violet and purple. A false or fugitive purple is also made by means of logwood with the tin liquor, and a small proportion of vitriol of copper.

Red....Alum liquor with argol, as a mordant, then madder in the proportion of ½ lb. of madder and ¼ lb. brazil, or brazil-letto, to the piece. Red-wood, and nicaragua wood are bad substitutes for brazil. A false red may also be made by substituting log-wood in part for madder.

Chocolate....Add to the alum liquor with argol, about one half of the acetite of iron and proceed as for red.

Pink....Take bastard saffron or the carthamus tinctoria, usually called safflower. Put it in a bag, wash it well in cold water, treading it, until all the yellow colour is extracted, and the water no longer tinged. Then put it into an alkaline ley made of pearl-ash in the proportion of about ½ lb. to the gallon of water: this will extract the pink colour from the safflower, and give it out to the woollen or silk immersed in it. Old pieces of

pink cloth may be immersed in an alkaline lixivium, and the colour extracted will dye afresh.

Yellow....Alum with argol: then for a fast yellow weld, or quercitron bark (quercus tinctoria of michaud.) For a false yellow, fustic.

Orange and Nankeen....Dissolve annatto in caustic alkali, and add of this solution to hot water according to the required tinge: or,

For a faster colour, take iron in the nitrous acid, as much as may be sufficient to produce the required tint, and then run the goods through lime water: or,

Take the alum liquor with argol, then dye with a decoction of mahogany: then run the goods through the tin liquor, and again through the mahogany liquor. The precipitate of platina from AR by sal-ammoniac gives a beautiful nankeen, but too dear to be used.

Blue.....The fast colours are made by means of the blue vat with indigo: the false colours by means of the vat of pastel or woad: or by means of vitriolated copper and logwood.

The blue vat is made in different ways; by caustic alkali; by urine, or by lime alone, and it may be hot or cold.

A vat with caustic alkali may be made thus: to a pound of indigo well washed, add 1½ lb. of pearl-ash, and 2 lbs. of lime, fresh-slacked, with about 2 glls. of water; boil them for two hours, then add them to about 20 galls. of hot water, to which add ¼ lb. of green vitriol, (vitr. iron) and as much red arsenic; stir it frequently; when a green froth has risen, it is ready: or,

Grind a pound of indigo in urine, fresh or stale; add it to about forty galls. of urine; stir it with a rake, till the green scum rises, and the indigo appears dissolved.

The vat, with lime alone, is not so good.

Dip the cloth in this, till the vat be exhausted.

The attempts to dye with Prussian blue, have not succeeded in point of expence.

Saxon blue....Take indigo and grind it well, wash it in hot-water, till there be no more foulness in the water: to each pound of indigo, add 1 lb. of oil of vitriol, which will not answer the purpose, unless it weighs 29½ oz. to the wine pint. This should be made in a glass retort, and in a warm place, but not with heat.

Green....First dye a yellow, and then a blue.

Olive....Take equal parts of alum liquor and iron liquor, and then dye with the yellow drugs.

Black....Iron liquor, with a small quantity of verdigrease; then a dye liquor of about 1lb. of the drugs, to 1lb. of wool; the drugs being a mixture of madder ¼, and log-wood ¾. The colour is mended, by adding a small quantity of nitrated iron to the mordant, and a small quantity of galls to the drugs: the verdigrease with the log-wood, gives a blue tinge. Lessen the mordant in strength, and you get all the shades, approaching to black.

DYEING OF COTTON.

Drab....Mordant; alum and copperas, in equal parts....Drugs; fustic and sumach.

Olive....Mordant, blue vitriol, with copperas, for a greenish olive.... Drugs; fustic and log-wood: for a brown or reddish olive, add sumach.

Mud....Mordant, alum, and copperas....Drug; sumach.

Bloom...Mordant; alum and copperas; or, instead of alum, tin in

spirit of salt....Drugs; log-wood, and sumach.

Purple....Mordant; tin in spir. salt, or aqua regia: drugs; log-wood, if not a blue purple, add braziletto.

Chocolate and Brown....Vitriolated iron, and fustic; then vitriolated copper and logwood: or if a bright chocolate is wanted, brazil and the tin mordant.

Buffs and Nankeens.....Annatto and fustic: Or for a good and tolerable fast nankeen, take equal parts of alum and argol, and dissolve them: this will produce a tartarite of alumine, and sulphite of pot-ash. They should be dissolved in as small a quantity of water as may suffice, in 2lbs. of alum and 2lbs. argol to 1½ gallon of hot water; of this solution add a quart to a gallon of hot water; immerse the cotton for an hour; take it out; immerse it in a hot decoction of mahogany shavings, 1lb. to the 1lb. of cotton; let it simmer till the dye is exhausted; finish by running it through the tin mordant about ½ a pint to the gallon of water; then wash off.

Fast Buffs....Tinned iron plates dissolved in aquafortis, then raised in lime.

Yellow....Alum liquor, and a small quantity of verdigrease, with weld or fustic.

Green....Blue vitriol (vitriolated copper) with fustic and logwood.

Crimson and scarlet....Tin in aqua regia. Then Brazil. Brazilletto or Nicaragua will not give the required colour.

Pink....See the process with safflower, above given.

Turkey Red....Boil the grey cotton for 3 hours in pearl-ash and fish-oil, about an ounce of each, to each pound of cotton, and water enough to cover it; wash it and dry it. Immerse it during ten days in fish-oil. Squeeze or rince it well, and hang it up to dry. Run it through a hot solution of alum, in the proportion of alum, one part; water, forty parts by weight. Then run it through a mixture of cow-dung and hot water. Again through the alum liquor. Then through a decoction of galls or sumach; an ounce of galls to the pound of cotton. Then through a dilute solution of glue. Alum it again after washing. Madder it with ½ a pound of madder to the pound of cotton. Alum it again and madder it again, with from ¼ to ½ pound of madder more to the pound of cotton. Brighten it by boiling it for half an hour, in a very weak solution of white soap.

This colour may be imitated, thus:

Boil the grey cotton in pearl-ash and oil, as above. Wash it and dry it. Alum it as above, and then run it through the cow-dung liquor. Wash it. Take the common printers mordant, of alum 1lb. sugar of lead 2lbs. water one gallon. Dissolve. Add another gallon of water. Immerse the cotton for a day in this hot solution. Then madder it with ¾ of a pound of madder and one ounce of galls, to the pound of cotton.

The above may be relied on."

Observations on maddering, together with a simple and certain process for obtaining with great beauty and fixity, that colour, known under the name of the Turkey, or Adrianople red: By J.M. HAUSSMANN*. *Trans. for* TILLOCK'S *Phil. Mag.*

I have already indicated in the

* From the Annales de Chimie, No. 122.

*Annales de Chimie**, and the *Journal de Phisique*, that earths and metallic oxides have more or less the property of attracting and retaining the colouring parts of vegetable and animal substances; alumine and the oxide of iron possess it in a greater degree, than the oxide of tin; but the attractive force of the latter, far surpasses that of the other earths and metallic oxides, in regard to the colouring parts of the said substances.

Alumine and metallic oxides do not retain, with the same force of adhesion, the colouring parts of all animal and and vegetable substances indiscriminately; that of madder adheres much stronger than those of the other colouring substances, which may be classed in the following order; kermes, cochineal, logwood, yellow India-wood, woad, quercitron, brazil-wood, red India wood, yellow berries, &c.; the gall-nut, sumach, and other astringent colouring substances, act principally, by means of the gallic acid; and, in regard to their degree of fixity, may be placed immediately after madder: the case is not the same with the Prussic acid, which communicates a colour to different metallic oxides, from which it can be separated cold, by alkaline leys.

To judge of the fixity of colours arising from animal and vegetable substances, the best method is to employ a ley of oxygenated muriate of potash, or soda, with excess of alkaline carbonate. The longer or shorter resistance which the colours make in this ley, will indicate what they will make, when acid, alkaline, saponaceous, and other re-agents are employed.

In the art of dyeing, and that of cotton printing, the name of *maddering* is given to that process by which the colouring parts of madder are transferred, by means of water with the aid of heat, to alumine, or to the oxide of iron fixed in any kind of stuff.

The brightness and fixity of the colours obtained from maddering, depend not only on the process, but also on the state and purity of the water, as well as of the madder.... It is, therefore, absolutely necessary to avoid, or to render inactive every acid, alkaline, or saline substance that may be contained in the water, or in the madder itself. I have shewn that, by adding carbonate of lime (pounded chalk,) madder, which I suspected to contain gallic acid, was corrected: but, that my friend, CHARLES BERTHOLDI, professor in the central school of the Upper Rhine, afterwards found, that it was sulphuric acid, united to magnesia.

The important discovery of this addition of chalk, which I made 25 years ago, has given birth to many manufactories, and improved all those established near waters which do not run over, or hold in solution this earthly salt, without which, it is absolutely impossible

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* We must here mention, that C. CHAPTAL, minister of the interior, a good judge in matters of this kind, when he communicated these observations, wrote as follows: "C. HAUSSMANN, manufacturer of printed cotton, at Laglebach, near Colmar, in the department of the Upper Rhine, well known among those chemists, who apply the discoveries of science to improvements in the arts, transmitted to me the annexed Memoir. In my opinion, it will be of utility to make it known in your Annals; and the author, on my request, has consented to its being published."....*Note of the editors of the Annales de Chimie.*

to obtain beautiful and fixed madder colours.

This chalk since that time has become a new object of commerce; and as the price is very moderate, I have not yet determined the just proportion to be employed: in general, I take one part for four, five, or six of madder.

In order to obtain the brightest madder colours, it is not sufficient to attend to the quality of the water and of the madder; it is necessary, also, to observe the degree of the heat of the bath: a low temperature will check the attraction of the colouring parts, and prevent them from being extracted, while one too high will favour this adhesion of the yellow particles of the madder, which obscure and tarnish the shades intended to be produced. The only colour which gains by increasing the heat is black. I have always observed, that on withdrawing the fire from below the boilers, when the hand can no longer be held in the aqueous vehicle which they contain, if the maddering be then continued for two or three hours, the most satisfactory results will be obtained, as the furnace still retains a sufficient quantity of heat to maintain the vehicle at the same temperature, especially when, according to custom, large boilers are employed. Besides, it would be very difficult to fix a determinate degree of heat by the thermometer, when the furnaces are large.

The yellow parts of the madder, as well as of other colouring substances are, it is probable, nothing else, than the colouring parts themselves, combined with oxygen. The product of this combination, by acquiring solubility, suffers itself with more difficulty, to be taken away by clearing, if the heat has not been properly regulated during the process of dyeing. I have often observed, that madder and other colouring substances, when long exposed to the atmospheric air, do not give colours of the same intensity, and the same brightness as before, either because these substances absorb the oxygen of the atmosphere, or that they procure this radical from the water which they attract, or which they naturally contain as a constituent principle, and which is decomposed by a slow and insensible fermentation. The exposure, on the grass, of cotton or linen dyed a dark madder red, might support the idea of a change to a reddish yellow; for this dark colour becomes clearer, but fainter, by the exposure, and then assumes a more agreeable shade of crimson. I have shewn in a Memoir on indigo, inserted in the *Journal de Phisique*, for the year 1788, that nitric acid changes this blue fecula into a yellowish substance: a similar change takes place by exposing, on the meadow, the same fecula fixed on any stuff whatever; and the yellow resulting in these two ways is more soluble in warm water, than in the same liquid when cold. It however appears, that the combination of oxygen is not the only cause of the change of colours, since curtains of any stuff dyed or coloured any shade whatever by vegetable or animal substances, and exposed to the light, lose their colour entirely in the course of time on the side exposed to the solar rays, while the opposite side retains it for a considerable time. If the rays of the sun then give more vigour to living bodies of the animal and vegetable kingdom by disengaging from

the latter oxygen gaz, it appears, that they act with destructive influence on the same bodies deprived of life, by decomposing their constituent principles. In all cases, it will be proper to preserve the colouring ingredients in dry places, sheltered from the light, which acts upon these bodies, perhaps, only by decomposing the constituent aqueous part, the oxygen of which may join the carbon to form carbonic acid....resinous and oily substances should be preserved in the same way. These conjectures prove at least, that the action of the sun's rays, or of light on these bodies in general, presents a vast field for interesting experiments to be undertaken.

If in maddering, brighter colours are obtained, by carefully regulating the heat, a sacrifice is made at the same time of a small portion of the colouring parts of the madder, which cannot be entirely exhausted, except by then increasing the heat to ebullition; but, as the colours thus obtained, are degraded more or less in the ratio of the quantity of the madder, the gall-nut or sumach used: this method must be employed with caution, and principally for common effects, either in regard to cotton or linen. To avoid as much as possible, the loss of madder after the maddering of good articles has been terminated; and before the common ones are put into the boiler, powdered gall-nut or sumach must be added, with a new but small portion of madder: the process must be managed also in such a manner, that the ebullition shall not take place, till two hours after.

I several times tried to exhaust the madder by simple ebullition, and without adding any thing else than chalk; but I found that this was unfavourable to all colours, black excepted: it even appeared, that the effect of the madder was much less, than when the heat was moderately applied, and when the accumulated caloric easily decomposed the colouring substance. It is this tendency to be decomposed, and particularly by fermentation, however it be moistened or diluted with water, which has hitherto prevented me from obtaining a substantial colour, pretty dark and sufficiently fixed to be applied on any kind of stuff. I observed also, that if the heat was carried too far the first time, in circumstances when it was proposed to madder a second and third time, it prevented me not only from obtaining bright and agreeable shades, but also, of the requisite intensity. The aqueous vehicle of the madder, at too high a temperature, never fails to weaken the adhesive force of the alumine and the oxide of iron to the stuff, and to take from it a portion, which an experienced eye may easily remark, on examining the bath.

I shall here repeat, that for common and low-priced articles, it is indispensibly necessary to employ gall-nuts or sumach, which will save one half, and even two thirds of the madder; but the colours obtained, are neither so fixed nor so bright. The addition of chalk, however, must not be omitted; otherwise, the gallic acid will carry away a portion of the alumine and coloured oxide of iron, which will weaken the shades, and by tarnishing the stuffs, will also attack the white, which may have been preserved in them. Without the addition of gall-nuts or sumach, it seemed to me impossible to exhaust

the madder entirely of its colouring parts, which made me presume that their adhesion is favoured by the viscid nature of the tanning principle of these astringent substances, which carry away and combine with themselves the colouring parts. I shall observe, also, that gall-nuts, as well as sumach, lose the property of dyeing black; and acquire on the other hand, that of dyeing or colouring alumine yellow, oxide of iron, olive-green, by the addition of chalk, the calcareous base of which unites itself to the gallic acid. Do these yellow and olive-green colours arise from any peculiar substance contained in the gall-nuts and sumach, or are they indebted for their origin to the tanning principle? This remains to be examined.

The quantity of madder to be employed in dyeing, ought not only to be proportioned to the extent of the surfaces to be maddered, but also to the concentration of the *acetite of alumine and iron*, improperly called *mordants*; that is to say, to the greater or less quantity of alumine and oxide of iron, which these saline liquors, either insulated or mixed together, when they dry on the articles to be dyed, may have left or deposited there by the evaporation of the acetic acid. If the objects to be dyed are not numerous, and in particular, when bright shades only are to be produced, they may be maddered only once; but when they are numerous, and intended to have dark shades, the maddering must be repeated twice, and even thrice.... Three quarters of a pound of madder of a good quality, are sufficient for dyeing a piece of white Indian cloth, of ten ells in length, and three quarters broad, intended to exhibit only a few coloured objects: the quantity of the colouring substance must be increased in the ratio of the mass of alumine and oxide of iron, fixed on a piece of stuff of the above dimensions. It may be extended to 6, 8, 10, and even 12 lbs. for a ground well covered with a lively and very intense colour. Intelligence and practice in the management of a dye-house, will not fail to indicate nearly the proper proportions.

Whatever care may be employed in maddering, to avoid the adhesion of the yellow parts, the colours obtained will be far from having all the beauty and fixity which they might acquire by clearing, preceded by very large ebullition in exceedingly pure water. This ebullition alone, by the addition of bran, will serve to brighten the colour: more rosy reds will be obtained, by employing soap with or without the addition of bran; carbonate of pot-ash, or of soda, substituted for bran, will make the reds incline to crimson; but I must observe, unless the workman chooses to run the risk of making the reds entirely brown, and in such a manner, that it will not be possible to restore them, it will be necessary before soap and alkalies are applied to the stuffs, to expose them to the action of the strongest heat that can be communicated to water. This operation will be attended with success, if as little passage as possible be afforded to the steam, and if the boilers employed be converted into a sort of digesters. The fixity of the colours will be proportioned to the time employed in exposing them to the action of the boiling water. It is needless to observe, that there is no danger of spoiling the co-

lours by soap and alkaline corbonates, when the maddering, instead of being directed with a moderate heat, has been carried to ebullition, as is practised in many dye-houses; but, in this case, the colours obtained are more difficult to be cleared.

As water charged with oxygináted muriatic acid, easily carries away the colouring parts of madder, as well as other vegetable and animal substances, by decomposing them; and as acids more concentrated may, in their turn, take from the stuffs, the colourless alumine and the oxide of iron; it is impossible for me to adopt the idea of a chemical combination of the colouring parts with alumine and metallic oxides, which, in my opinion, when fixed and coloured on my stuff, form only compound aggregates.

The clearing of objects printed on a white ground requires modifications, which I shall detail on a future occasion, when I find leisure. It will therefore be sufficient at present to state, that after continuing for some time my experiments on the Turkey red, inserted in the *Annales de Chimie*, for the year 1792, I at last found a red much more beautiful and durable, than that of the Levant, by fixing alumine on cotton, thread, and linen, by an alkaline solution of this earth mixed with linseed oil....The following is the process I employed:

THE PROCESS.

After making a caustic ley, of one part of good common pot-ash, dissolved in four parts of boiling water, and half a part of quicklime, which I afterwards slaked in it, I dissolved one part of powdered alum in two parts of boiling water; and while this solution of sulphate of alumine was still warm, to avoid re-crystallization, I speedily poured into it successively, always stirring it without interruption, the above mentioned caustic ley, till the alumine it had at first precipitated after saturation to excess with sulphuric acid, had been re-dissolved. I left at rest this solution of alumine, which exhaled ammonia, and which, on cooling, formed a precipitate of sulphate of pot-ash in very small crystals, I then mixed a thirty-third part of linseed oil, with which the alkaline solution of alumine formed a kind of milky liquid.* As the oil gradually separates itself from this mixture under the appearance of cream, it must not be employed till it is again shaken. The skains of cotton, or linen ought to be successively immersed in it, and equally pressed, that they may be then exposed to dry on a pole, in the order in which they have been taken from the mixture. They must be dried under shelter from rain in summer, and in a warm place in winter, and be left in that state for 24 hours: they must then be washed in very pure running water, and be again dried; after which, they are to be immersed in an alkaline ley, pressed and dried a second time in the same manner as the first, taking care, however, to recommence the immersion in the ley, with those skains which have been last in the oily mixture, because the first never fail to carry away a larger portion than the last; it will be proper, also, to

* In fact, a saponaceous liquor is formed, containing alumine.....A. TILLOCH.

consume the mixture each time, that it may not have leisure to attract the carbonic acid, with which the lower region of the atmosphere is always charged, especially in manufactories; for the alkali, by passing to the state of carbonate, suffers the alumine to be precipitated, and loses the property of mixing with the oil.

Two immersions in the alkaline solution of alumine, mixed with linseed oil, will be sufficient to obtain a beautiful red; but by continuing to impregnate the skains a third, and even a fourth time, with the same circumstances as the first, colours exceedingly brilliant will be produced.

The intensity of the red, proposed to be obtained, will be in proportion to the quantity of the madder employed. By taking a quantity of madder equal in weight to that of the skains, the result will be a red, which, by clearing, will be changed to a rosy shade; on the other hand, shades of crimson, more or less bright, will be obtained by employing two, three, and even four times the weight of madder, without ever forgetting the addition of chalk, if the water employed does not contain some of it. Four parts of this colouring substance will produce a red too intense and beautiful to be employed in commerce, as it would be too dear to find purchasers.

By making an oily alkaline solution of alumine, with two or three parts of water, and impregnating the skains twice, and even four times, in the manner above mentioned, bright shades will be produced without the use of much madder; but they will not have the same intensity, as those procured with even as little madder by means of the same solution concentrated.

The best method of obtaining shades, lively as well as bright, is to expose the dark reds for a considerable time, when they have been cleared, to the action of a ley of oxiginated muriate of pot-ash, or of soda, with excess of alkaline carbonate, in order to have such a degree of shade as may be required: but it may readily be conceived that this method would be expensive.

To have the oily alkaline solution of alum, nearly in the same state of concentration, it will be necessary to employ an hydrometer, to determine the degree of strength of the caustic ley, before it is employed for the solution of the alumine. This caustic ley must be made with the best common pot-ash that can be procured, and the degree it gives by the hydrometer must be noted, in order that if pot-ash of an inferior quality be afterwards employed, the ley obtained may be carried to the fixed degree of evaporation.

Caustic ley, made with four parts of good common pot-ash,* cannot contain a large quantity of foreign salts. By making it on a large scale, when the limpid part has been decanted, it will be necessary to shake the deposit, for some time, twice every day, that the rest of the alkaline liquor may be decanted; and that none of what still remains in the deposit may be lost, it ought to be diluted with more water, which may be afterwards employed to lixiviate

* I have no doubt that, where pot-ash cannot be procured, soda might be employed. The Author.

the cotton, which must be well purified and cleaned before it is dyed; which may be done by lixiviating and soaping, or merely boiling it in water and then rinsing and drying it. As wringing with the hands may derange the filaments of the skains of cotton and linen, and consequently weaken the thread, it will be proper, in operating on a large scale, to squeeze them by means of a press.

In regard to thread or linen, to be dyed of a beautiful dark and fixed red, it must be well bleached, and impregnated, at least four times successively, with the oily alkaline solution; because not only alumine and metallic oxides adhere with more difficulty to linen than to cotton, but because these mineral substances, when coloured, abandon linen much easier than cotton when clearing. It still remains to examine whether, between each impregnation with the oily alkaline solution of alumine, cotton or linen thread requires to be left at rest for a greater or shorter time, before it is rinsed and dried.

All fat oils may be employed in the mixture, with proper precautions; but linseed oil mixes better, and remains longer suspended in the alkaline solution of alumine: I never tried fish-oil, which perhaps, would be preferable. It is probable also, that in operating on a large scale, it would be best to diminish the quantity of linseed-oil, in the mixtures with the alkaline solution of alumine; for I have had reason often to observe, that too much oil hurts the attraction of the colouring parts of the madder: a thirty-third part of linseed-oil, always produced the best effect, in my trials on a small scale.

In regard to the process of dyeing cotton and linen thread, sufficiently charged with alumine, by the oily alkaline solution of that earth, the skains must first be disengaged from every saline substance, as well as from the superfluous oil, by rinsing them a long time in very pure running water; after which they must be arranged, without drying them, on an apparatus which the operator may construct according to the form of the boiler, in which it is to be placed, in such a manner, that during the process of dyeing, the skains may be continually shaken and turned; in order to catch every where, and in an uniform manner, the colouring particles. The bath must be composed with madder, mixed with a sixth of pounded chalk, and diluted with about 30 or 40 parts of water. ....The heat must be carried only to such a degree that the hand can be held in the bath for an hour without being scalded; and it is to be maintained, at this degree, for two hours, either by diminishing or increasing the fuel. Three hours dyeing will be sufficient to exhaust the madder: the skains when taken from the bath, must be washed in a large quantity of water to cleanse them: they are then to be cleared by boiling them a pretty long time, in water containing bran, inclosed in a bag, adding soap and alkaline carbonate, to give the red a rosy or carmine shade.

As I never had occasion to dye cotton or linen thread, on a large scale, I employed a small boiler, which served me at the same time, for the process of clearing; in the latter operation, I confined myself to boiling the skains, properly arranged, in water containing a bag filled with bran, for eight hours

successively; and, that I might not interrupt the ebullition, I replaced the evaporated part by the addition of more boiling water. In this clearing, I employed neither soap nor alkali; yet I obtained a red, superior in beauty and fixity to that of the Levant, and and which, in every respect, will bear a comparison with the colours dyed in France. For dyeing my red, I employed three parts of the best madder for one part in weight of dry cotton thread.

With the precaution I took to obtain an uniform shade, I could have dyed at one time, but I should always recommend performing this operation at two different times, taking each time, half a portion of madder and of chalk, if the skains cannot be continually turned in the boiler, it may serve also for clearing, by adapting to it a cover, so as to suffer very little of the vapours to escape, because it would be too expensive to replace the part evaporated by more boiling water. By operating on a large scale, and concentrating the heat in the boilers, keeping them almost close, there, perhaps, would be no need of employing eight hours ebullition, to clear and fix the colour. I have every reason to believe, that this clearing of the Turkey red, gave rise to the idea of bleaching with steam: it must have been seen that colours, by being cleared, lose considerably in regard to their intensity; and perhaps it has been observed at the same time, that the pack-threads, employed for arranging the skains, were bleached during the clearing, especially when alkalies were added.

A great variety of colours, and of different shades, may be obtained, by following the process here described for obtaining beautiful and durable reds. In this case the oily alkaline solution of alumine, must not be employed till the required shade of oxide of iron, or indigo blue, has been given, but whatever may be the colour, or shade, which you wish to give, before you fix the alumine on the skains of cotton or linen, these skains must always be first well boiled, by which means the adhesion of the indigo fecula, as well as that of the oxide of iron, will be increased in the same manner as that of alumine, coloured by the colouring parts of madder, when subjected to the action of the heat of boiling water before they are impregnated with the oily alkaline solution of alumine. As the method of dyeing indigo blue, in all its shades, is well known, it is needless to detail it; and as to giving a rusty yellow colour, which may be done at little expence, nothing is necessary but to moisten the skains well with the solution of sulphate of iron, to press them equally, and then to immerse them in a caustic ley of pot-ash, which will precipitate and fix the oxide of iron of a disagreeable colour, but which will not fail to assume a rusty yellow shade, by attracting and becoming saturated with the oxygen of the atmosphere: thus yellow will become more or less dark according to the quantity of the sulphate of iron in solution. More intensity, and even more equality, may be given to the rusty yellow, by moistening the skains a second time in the ferruginous solution, and immersing them in the caustic ley. Care, however, must be taken not to use soda for this operation, because it general-

ly contains sulphur, which blackens oxide of iron by mineralizing it.

The skains coloured blue and rusty yellow, treated with oily alkaline solution of alumine, will produce by maddering, dark purple and chamois colours, violet, lilac, puce, mordore, &c. It may be easily conceived, that if, instead of maddering, the same skains prepared for maddering, be dyed with kermes, cochineal, and Brazil-wood, log-wood, wood of St. Martha, woad, yellow-wood, quercitron, yellow berries, &c. a great variety of colours will be obtained: the shades may even be varied *ad infinitum*, by mixing the colouring ingredients with each other in different proportions. The affinity of adhesion of the colouring parts of all these ingredients, varies also, to such a degree, that the shades arising from a yellow or olive green, will be changed, or totally metamorphosed, by a second dyeing with madder, kermes, cochineal, or Brazil wood; and will furnish orange shades, capucine, carmelite, burnt bread, bronze, &c. As the preliminary preparation of the skains by the oily alkaline solution of alumine, might be too expensive for some of these colours, the process I described in the *Annales de Chimie*, for the year 1792, p 250, may be substituted in its stead. The process consists in treating the skains, alternately, with soap and sulphate of alumine, the excess of the acid of which has been saturated with one of the alkaline carbonates, or with lime: this method is very expeditious. In the course of a day, especially in summer, the skains may be prepared and dyed red as well as other colours; which, for the most part, may be subjected to ebullition, and will bear clearing with bran for a quarter or half an hour, and even some of them for a whole hour. It is also to be observed, that there are none but madder colours, the alumine and oxide of iron, bases of which have been fixed on the stuffs, by means of the oily alkaline solution, that can acquire perfect fixity by the action of heat of boiling water; and that the fixity is very inferior in all madder colours, the earthy and ferruginous bases of which, have been applied to stuffs by means of acid solvents.

Alumine fixed in abundance on cotton or linen stuff, by means of a highly concentrated alkaline solution attracts very easily the colouring parts in the process of maddering. The case is not the same when the same earth is applied, by the most highly concentrated acetic solution of alumine; and it is absolutely impossible to finish maddering at one time, even when a profuson of madder is employed, and the operation is repeated three and even four times*. This circumstance will give rise to new and interesting experiments; but my observations prove in the mean time, that maddering, in general, requires to be managed with the nicest attention.

Process for dying wool, in the grease, a permanent blue colour. From the "Annales des Arts et Manufactures."

"Mr. Favieux, chemist, of Toulouse, has communicated a very

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* Concentrated acetic solution of oxide of iron, is attended with nearly the same difficulties.

economical process for dyeing wool, in the grease, a blue colour, from the darkest to the lightest tint: this process is of the greater utility, as the colour is more permanent, and stands any trials to which it may be subjected, better than if the wool had been washed previous to the operation.

Take four ounces best indigo, reduce it to a very fine powder, and pass it through a silk sieve. For every 4 oz. of indigo, take 12 lbs. of wool in the grease; put the whole into a copper, large enough to contain all the wool to be dyed. Commence the operation by covering the bottom with a thin layer of indigo powder, on which put one of wool, then a second of indigo, and thus alternately, one of each, till the boiler is full; taking care that the first and last layer be of indigo, and the wool be well separated in layers of equal quantity.

A ley should be previously prepared, of wood-ashes or potash, marking two degrees on the hydrometer, and in sufficient quantity to fill the boiler, and cover the materials entirely; before the ley is poured on them it should be warmed, but not made so hot as to prevent the manipulations.

As soon as the boiler is filled, the wool is pressed down equally all over, and worked with the hand, that it may imbibe the liquid in an uniform manner. A gentle heat is kept up till the next day, with small coal, or only hot ashes thrown underneath the boiler; attention must be paid to raise the degree of heat, before and during the manipulation, and to work the wool every day for about a week; the more labour is bestowed on manipulation, the greater uniformity and intensity it acquires.

As soon as the requisite colour is obtained, the operation is terminated by washing and drying the wool; a light blue may be produced by diminishing the quantity of indigo, and proceeding in the same manner. The liquor remaining from dyeing may be again used, to produce light blues.

This very simple process is, without doubt, within the reach of country people, for whom it was principally contrived, by Mr. Favieux; and it is the most economical process existing for the purpose.

The author asserts, that the colour is as beautiful and permanent as the finest blue produced by woad; but a still more important object is, that by this method of dyeing wool, it loses less in weight than if it were previously scoured."

A late writer in an American paper, says, that he tried some experiments on the *sea nettles*, which are cast on shore by fishermen, and found that a liquid which they contained, dyed woollen, cotton, and silk articles, a bright and beautiful purple, which increased the oftener it was washed. As sea nettles abound on many parts of our sea coast, the above hint deserves attention.

Pokeberry-dye. Mr. Moses Lindo of South Carolina, in 1764, boiled $\frac{3}{4}$ of a pint of the juice with a pint of rain-water about $\frac{1}{4}$ of an hour. He then took pieces of flannel, and numbering them 1 and 2, boiled them in a separate pot with alum a quarter of an hour, and rinsed them in cold water. He then dipped the flannel No. 1, into the pot of juice, and after it had simmered five minutes, he rinesd it in cold water: a crimson dye was fixed in the piece superior to

the colour of the juice itself. He then dipped the flannel No. 2 in the juice, and washing his hands, which were stained with the juice, in lime water, he found the colour change to a bright yellow. He then threw a wine glass full of lime water into the pot where No. 2 was simmering, which turned both juice and flannel to a bright yellow. Thus he found that alum fixed the crimson, and lime water the yellow colour.

These experiments deserve attention. If the dye of the phytolacca could be fixed, a most valuable acquisition would be made to the national resources.

For observations on the use of SAFFLOWER in dyeing, See that article.]

A patent was granted to Mr. JAMES BAYLEY, of St. Leonard's, Shoreditch, dyer, for his invention of a machine for dyeing, staining, or printing handkerchiefs, &c..... The patentee employs frames of wood, brass, copper, or other metals, on the faces of which are small blocks, projecting in such a manner, that when the face of one frame is placed against that of another frame, the blocks are all exactly opposite, and correspond with each other: thus an handkerchief, &c. being put between, and the frames fastened together, the dye will be communicated to every part of it, excepting those places which come between the blocks, and retain their original colour. These frames are provided with handles for raising them out of the copper, &c. by means of pullies; and may be put together to any number, according to the length of the article to be dyed; as they are conjoined on both sides with planks, having screws and nuts at each end, for the purpose of keeping them steady.

Another patent was lately granted to Mr. SAMUEL GREATRIX, of Manchester, for a new invented process of dyeing and staining colours upon cloth.....The process is shortly this: For dyeing black, Mr. G. takes tar, and iron liquor, adding to each gallon three quarters of a pound of fine flour, which he boils to the consistence of a paste, and then puts into a tub that forms part of a rolling-press machine, of the common construction. The goods are passed through the paste between two rollers, which diffuses it equally and completely over the whole piece. They are next dried in a hot stove, afterwards soaked in a liquor made of cow-dung and water, scalding hot in the copper, then washed and rinsed in clean water. Lastly, the goods are dyed in a decoction of sumach, madder, logwood, or other dyeing drugs, in the usual manner. The patentee also employs other mordants, such as iron liquor, paste, or gum, alum, &c.....The chief improvement in this patent, consists in employing, instead of the usual methods, a rolling-press to fix the mordant on the cloth, which renders the process somewhat of a middle kind between dyeing and calico-printing.

The art of dyeing, though in its infancy, has lately been considerably improved, in consequence of the numberless discoveries made chiefly by French chemists. Among other useful facts, the enumeration of which would fill a volume, we shall at present only mention one, of the greatest importance to dyers. M. M. GUYTON and VAN MONS have found, by repeated experiments, that the *acid* of *wolfram*

affords one of the most effectual means of precipitating the colouring matter of vegetables. The former, in particular, observed that this acid not only rendered the colour of *silks* dyed with the juice of aloe more brilliant, but also imparted to them (according to the different strength of the acid employed), a variety of shades, from the most delicate lilac to the most beautiful violet, and from the deepest orange to the most lively red. But he ingenuously adds, that, in the different trials he thus made with wool, the result did not give him equal satisfaction.

Among the latest publications that have appeared on this subject, we shall mention only the *Art of Dyeing*, translated from the French of BERTHOLLET, by Mr. HAMILTON (2 vols. 8vo. 12*s*.) published about the year 1789; and Mr. HAIGH'S *Dyer's Guide*, (12mo. 3*s*. 6*d*.).....For an account of the different methods of dyeing particular substances, we refer the reader to the articles, BONES, HATS, LEATHER, MARBLE, PAPER, WOOD, &c.

DYERS'-GREEN-WEED, or WOOD-WAXEN, *Genista tinctoria*, L. is an indigenous plant, growing in pastures, and on the borders of corn-fields. It produces yellow flowers, which blow in the month of July or August, and are succeeded by numerous seeds.

This herb is eaten by horses, cows, sheep, and goats:....the flowers afford a yellow colour, which is preferred to every other, for dyeing wool green. This plant also yields the fine yellow lacker of painters, by boiling the stalks and leaves in lime-water, and again placing the clarified decoction over the fire, with chalk and alum.

A dram and a half of the seeds, when pulverized, operate as a mild purgative. A decoction of the whole plant is said to be diuretic, and has been given with success in cases of dropsy.

DYERS'-WEED, or YELLOW-WEED, *Reseda luteola*, L. an indigenous annual plant, growing in meadows, pastures, on walls and barren uncultivated spots, particularly on the rubbish thrown out of coal-pits. It has a cylindrical, hollow, furrowed stem, and produces yellow flowers, which blow in the month of June or July. This plant is not relished by cattle, few eating it, except sheep, which sometimes browse it a little.

The dyers'-weed imparts a most beautiful yellow colour to wool, cotton, mohair, silk, and linen, and is principally used by dyers for that purpose, as it affords the brightest dye. A decoction of this plant also communicates a green colour to blue cloths, and constitutes the basis of *dutch pink*. The tinging properties reside in the stems and roots, which should be cultivated in sandy situations; because rich soils render the stalks hollow, which consequently do not impart so delicate a colouring matter. As the durability and brightness of the colours obtained from this plant greatly depend on the circumstance, whether a just proportion of alum and cream of tartar have been used for the ley, in preparing the goods before they are dyed, we can from experience recommend *three* parts of alum to be used to *one* of tartar: if more of the former be employed, the colour will be pale; if a greater quantity of the latter, it will acquire an orange-shade.....M. CADD informs us, in the 29th vol. of the *Transac-*

tions of the Swedish Academy, that he found the following proportion of ingredients to be the most practically successful in making the preparatory lixivium: viz. for one pound of wool, two ounces of alum, six drams of cream of tartar, to be dissolved in three gallons of water, to which are to be added two handfuls of wheaten bran. After remaining twelve hours in this decoction, the wool is to be taken out, rinsed, then half-dried, and afterwards boiled, together with one pound of dyers'-green-weed, in four gallons of water; and after it has been some time over the fire, the plants should be removed, and half an ounce of the purest pot-ash (which must contain no *lime*, like the Essex ashes) added to the liquor; when the wool must be gently agitated, till it acquire the proper shade of yellow. The colour may be heightened by an additional portion of pearl-ashes, or salt of tartar; but its durability will thus be affected....If silk or linen are to be dyed, both the tartar and bran must be omitted, and the colouring matter fixed with alum and pot-ash: but, in woollen cloth or yarn, the permanency of the colour is remarkably promoted by the addition of wheaten bran.

[A water colour is made from Weld, and used by paper-hanging manufacturers, for elegant work.

It is the small seeds of the plant only, which afford the colouring matter.

Messrs. Collard and Frazer, of London, manufacturers of weld yellow, have published in *Tilloch's Phil. Mag.* vol. 18, the following process for preparing this elegant yellow colour, and they observe, that when made, it will fall into a fine powder, and require no grinding. They further remark, that there is not to be found, either in the vegetable or mineral kingdoms, any other substance which yields so elegant a yellow colour as the weld.

Take of pure Carbonate of lime, (fine washed whiting) any given quantity: say four pounds; put it into a copper boiler, and add to it four pounds of soft water: put a fire under the copper and raise it to a boiling heat, and keep stirring with a deal stick till the whiting be completely divided and form with the water a consistence quite smooth. Then add for each pound of whiting three ounces of alum previously pulverised tolerably fine. The alum must be added gradually, and the operator should keep stirring with his deal stick during the administration; for a double decomposition is effected, accompanied with effervescence, and carbonic acid is discharged. Thus, if the alum were not administered gradually the boiler would overflow from the violence of the effervescence, and if the whiting were not well divided previously to the introduction of the alum, the distribution among the whiting would be unequal, and the colour injured. When the effervescence ceases, the basis is properly prepared. The fire may then be drawn and it may remain for any length of time without injuring, till the other materials are ready. Place the weld with the roots uppermost, in another copper boiler, pour in soft water enough to cover every part containing seed, and boil them not more than fifteen minutes; then take them out, place them, with their roots uppermost, in a tub to catch the liquor which runs from them, and pass the liquor in the

copper with what runs from the weld in the tub, through a flannel filter, to intercept the seeds and fecula; and thus the colouring matter is prepared.

It is impossible to say what quantity of welds should be employed to any given quantity of whiting; for some bundles will contain three times as much seed as others. It is well however to know, that if too much colouring matter be prepared, it may be kept in an earthen or deal vessel for many weeks, without sustaining any injury.

Having filtered a sufficient quantity of the weld, put a fire under the boiler containing the basis, and add the weld liquor till the colour be attained. When sufficient colouring matter is added to the basis, the fire should be raised to a boiling heat and the work is finished. In order to be satisfied when the greatest strength of colour is attained, take a little out on chalk, which will absorb the moisture instantly, when it may be laid on paper with a brush, and received perfectly dry in a few minutes.

The contents of the furnace should then be put into a deal or earthen vessel to precipitate. The next day the liquor may be poured off, and the colour may be placed on large pieces of chalk, which in a few hours will absorb the moisture, and it will then be fit for use.

The liquor poured off from the colour, may, with the addition of water be used again, and the old welds may be boiled a second time, and taken out previously to the addition of fresh welds so that no colouring matter will be lost.]

DYKE, or DIKE, a sort of dam constructed of earth, timber, fascines, &c. to oppose the entrance of water from rivers, and from the sea.

Dykes made to exclude the sea from marshes, are built with sods cut out of the marsh, so as to make a ditch near the dyke, or else a ditch on each side. The sods are laid as a wall sloping on both sides; they should be laid very close, that the water may not enter; and some slender bushes should be laid between them, that the work may hold together the better. Some of the bushes should have roots to them, that they may grow, and more strongly bind the sods together. Shrubs without roots will not live placed in the dykes at midsummer, the time when dykes should be built.

A dyke seven or eight feet wide at bottom, and three at top, and made a little higher than the highest spring tides rise, will be sufficient on high marsh. When a dyke passes through a low place, or through a creek, it must be wider at bottom in proportion to the depth of the hollow, or creek, so that the sides of the dyke may be perfect inclined planes. Though this will make it very thick at bottom, it is necessary, that it may resist the greater pressure of water against that part.

When we build on an oozy soft spot, it is best to fill the mud with piles, driven as deep as they will easily go, and then cut off, even with the surface. This will give stability to the foundation, and prevent the water's undermining the dyke. On a sideling place, stakes should be driven through the dyke into the marsh, to hold the sods in their place.

In the creek, or creeks, there must be sluices, larger or smaller in proportion to the quantity of

fresh water that will need to pass out. *New England Farmer.*

DYSENTERY, or BLOODY-FLUX, an infectious disease, attended with a discharge of blood and purulent matter by stool; violent gripings; a continual inclination to go to stool; pains in the loins; fever, &c.

Unwholesome night-air, damp places, and a suppression of insensible perspiration, may be considered as the principal causes of this disease; which is also, though rarely, occasioned by the immoderate eating of *unripe*, acrid fruit....The opinions of practitioners, on the cure of the dysentery, being at great variance; one class of them proposing to cure it by bleeding and emetics (considering it as a "*rheumatism of the bowels*"); another by purgatives and astringents; a third by violent sudorifics (treating it as a "*fever of the intestines*"), we shall not detain the reader with their different notions, but briefly observe, that the treatment of the disorder chiefly depends on two circumstances: 1. Whether it be acccompanied with fever; and, 2. Whether the patient be of a sanguineous temperament, and plethoric habit, or the contrary. In both the former cases, we advise the reader not to attempt the cure of a disease which has often baffled the talent of the most learned and experienced, but immediately avail himself of medical advice, especially as the malady is contagious.

If, however, the dysentery be unattended with febrile symptoms, and the patient of a phlegmatic rather than choleric temperament, he may then take, at the commencement of the disease, a brisk emetic of a scruple or half a dram of the ipecacuanha-root in powder, and afterwards one grain of it every four or six hours: such medicine having, by experience, been found singularly efficacious. Hence, we do not venture to suggest either opium, antimonial tartar, rhubarb, or any other drug; as they can be of service only in particular cases. But the greatest advantage in this complaint will generally be derived from the application of clysters, which should consist of decoctions of the bruised ipecacuanha-root, namely, one dram boiled in a pint of water, till the third part be evaporated; or alternately, three quarters of a pint of fresh milk, in which one ounce of mutton-suet has been dissolved, should be administered luke-warm, and both repeated every six or eight hours.

The *regimen* in dysentery is of the utmost consequence. Animal food, whether solid or liquid, must be abstained from, till the violent symptoms have subsided, when chicken-broth may be allowed. The use of the salep-root, in the form of jelly, and the white of an egg and starch, taken in small portions, will afford sufficient nourishment, while they tend to restore the natural and abraded mucus of the intestines. In the decline of the disease, a solution of fresh mutton-suet in hot cow's-milk, to which a little starch and sugar may be added, after the fat has been removed from the top, affords both a wholesome and palatable dish. The copious use of *ripe* grapes has, in this disease, often procured very great relief; and, though the unlimited and promiscuous eating of fruit, in every stage and species of dysentery, may not always be proper, yet, in those cases where Nature points out such indulgence, by the ardent de-

sire of the patient, or where the blood appears to be in a broken, dissolved state, and a putrid acrimony infests the bowels, there is no danger to be apprehended from a free allowance of ripe, sub-acid fruit, which will, in general, be attended with happy effects.

[The *dysentery* often prevails in the country settlements in the United States, with great mortality. The cure must be begun by giving repeated doses of Glauber's salts, or Castor oil, and after the bowels have been well opened, opium in small doses may be given to procure ease. If fever attend, some blood may be taken away with advantage. The warm bath is highly useful to allay the violent pain in the bowels, and may be taken every day. The drinks should be of a mucilaginous nature, such as calves-feet boiled into a jelly, infusions of flax-seed in water, or arrow-root jelly. These liquids may also be injected into the bowels with advantage. Mutton-suet boiled in milk, also forms a very useful injection. The dysentery often is followed by a tedious diarrhœa, or looseness, without fever, which is difficult of cure. A gentle salivation raised by small doses of mercury, has proved an effectual cure for this form of the disease. Lime-water has likewise succeeded in some obstinate cases.

When the dysentery prevails as an epidemic, it is observed to be highly contagious. If flight cannot be conveniently effected, frequent purges of Glauber's salts, or Castor oil, must be taken to prevent the disease. These have been found in some instances highly beneficial.]

E.

EAGLE, the GOLDEN, or *Falco chrysaetos*, L. a bird of prey, which chiefly inhabits the northern parts of Britain: it weighs about twelve pounds, and is nearly three feet long; but, with its expanded wings, measures above seven feet.

These birds possess the senses of sight and smell in an uncommonly acute degree: they are also remarkable for their longevity, and their long abstinence from food. There are instances of eagles having attained an age exceeding one hundred years, and of one which existed twenty-one days without sustenance.

Eagles are very destructive to lambs, kids, fawns, and all kinds of game, especially during the breeding season, when they carry vast quantities of prey to their young. These pernicious birds are particularly mischievous in the Orkney Islands, where a law is in force, which entitles every person that kills an eagle, to a hen out of every house in the parish where such bird was killed.

[We have four species of eagle in the United States, viz. 1. Grey eagle, which is the largest: 2. Bald eagle, *(Falco leucocephalus)*: 3. Fishing eagle: 4. Black eagle.

Besides these, we have many species of Falco, or Hawks....W. Bartram.]

EAR, the organ of hearing, or that part through which animals receive the impression of sounds.

This organ is extremely tender, and subject to a variety of disorders. If it be suffered to continue for any length of time without being cleaned, a species of wax accumulates in it; which, if not speedily removed, becomes tough and hard, diminishes the acuteness of hearing, and produces at length total deafness. An abundance of ear-wax, if thin and acrid, occasions pain, and is sometimes accompanied with a running in the ears: hence these parts should be strengthened by washing them every day with cold water; by which the sense of hearing will be considerably improved and preserved.

The most common disorder to which these organs are liable, is Deafness. Having already treated of that malady, we cannot avoid animadverting on the impropriety of employing the common *ear-trumpets*, which, though they may afford temporary aid, ultimately destroy that useful sense. Deaf persons, however, may still be enabled to receive sounds, and in a more perfect manner, through the teeth and other bones of the head, than by communicating such sounds to the ear by the common trumpet. A better method, therefore, may be attempted by means of an ivory tube, of a cylindrical form, from 12 to 24 inches in length, and from $\frac{1}{4}$ to $\frac{1}{2}$ of an inch in diameter. If it be hollow throughout, the lower extremity should be made much wider than the part placed between the front teeth, through which the necessary vibration may thus be communicated to the internal ear.

To this may be added the distressing complaint, denominated the *ear-ach*, which usually proceeds from an inflammation, though it is sometimes occasioned by a sharp serous humour, stimulating the membrane that lines the canal of the ear: this painful affection also sometimes originates from insects that have penetrated the cavity of the ear; in which case, some sweet-oil should be introduced into the orifice, and the person ought to lie on that side of the body, the ear of which is the seat of complaint. By such means, the worm or insect may be extracted, and the pain consequently removed.

The ear-ach may be also occasioned by exposure to a current of air, from wet feet, and likewise from blows, or similar accidents.

For persons peculiarly liable to take cold, the best preventive will be, to keep both the head and feet warm and dry. In ordinary cases, Dr. Dancer is of opinion, that the patient will be relieved, by holding the painful side over the steam of warm water, and afterwards putting into the ear a piece of camphor wrapped in cotton, which has been previously moistened with a few drops of laudanum, or vitriolic æther....Electricity may also be employed, in some instances, with great success.

Should the pain, however, be extremely acute, and accompanied with throbbing, and other inflammatory symptoms, it will be advisable to resort to blood-letting, and to apply blisters behind the ear, or to the neck. If an abscess be apprehended, warm poultices should be frequently laid on the part af-

fected, before they become cold; and when such abscess breaks, milk and water, or chamomile tea, with the tincture of myrrh, must be repeatedly injected by means of a syringe.

EAR-WIG, or *Forficula auricularis*, L. a well known insect, which has received its name from penetrating into the human ear, where it causes the most acute pains, and even, as some have asserted, eventual death.

Various remedies have been applied to extract this noxious insect, such as the holding of a slice of apple to the ear; pouring of Madeira wine or brandy into that organ, &c. But the safest, and we conceive, the best remedy is, to pour olive-oil into the part affected, and to avoid on every occasion sleeping on the ground, particularly during the autumnal months.

Ear-wigs are likewise extremely destructive in gardens, especially where carnations, nuts, or filberts, pears and apples are reared. They are so peculiarly fond of the flowers first mentioned, that if they be not timely prevented, they will entirely destroy them, by consuming the sweet part at the bottom of the petals or leaves. To prevent these depredations, the usual practice is, to put the bowl of a tobacco-pipe, or the claws of lobsters, upon the sticks supporting the flowers, because ear-wigs creep into cavities and dark places during the day. The placing of hollow reeds behind the twigs of wall-trees, has been found of considerable service, if they be examined and cleared every morning. A visit at midnight, however, is preferable, as more vermin may then be destroyed in one hour, than can be exterminated in one week by the other means; and the garden will in a short time be, in a very considerable degree, if not totally, freed from their depredations.

The following method of extirpating these mischievous insects, is recommended by Mr. Forsyth, who has successfully practised it for several years. Let old bean-stalks be cut into tubes, about nine inches long; then be tied up in small bundles, either with pack-thread, or the pliant twigs of young willows; and be suspended on nails against the wall, in the vicinity of trees. Early in the following morning, a board about 18 inches square should be procured, and a small wooden trowel: the bundles of such bean-stalks are now to be taken down separately, stricken against the board, and the ear-wigs be destroyed with the trowel, as they fall out of the stalks....If this method be repeated daily, or every second morning, the increase of the insects will speedily be checked.

The propagation of these vermin may be still more certainly prevented, by immersing the shreds taken from trees that have been unnailed in autumn, in boiled soap-suds, for three or four days previously to using them again: in this simple manner, the eggs of ear-wigs, as well as those of other insects, will be effectually exterminated.

EARTH, in general, signifies that solid, incombustible substance which forms the basis of the globe we inhabit.

Chemists have, hitherto, made us acquainted with *eight* different species of *simple* earths, namely, 1. The *siliceous*, or flint; 2. *calcareous*, or lime; 3. *magnesian*, or talc; 4. *argillaceous*, or clay; 5.

ponderous, or barytes (Derbyshire spar); 6. *Strontian*, (from a place of that name in Scotland); 7. *Circon*, or jargon of Ceylon; and 8. *glucine earth*, very lately discovered by VAUQUELIN, and also called *sweet earth of beryl*....We cannot enter into an analysis of the different earths here enumerated, and shall, therefore, content ourselves with stating, that *simple earths* are rarely found in that state of purity; that all the strata of rocks (which compose in a manner "the shell of this globe," on the surface of which the vegetable mould is immediately incumbent) principally consist of *siliceous*, *argillaceous*, *calcareous*, or other compound earths, derived from the primitive kinds before specified; that stones are only earths in an indurated state; that the characteristic difference between earths and alkalis arises from the insolubility of the former, while the latter may be dissolved in water or other fluids; and, lastly, that most of these earths unite with acids, and neutralize them, like alkalis.

As we treat of those species of *earth*, which may be usefully employed in domestic economy, under their respective heads of the alphabet, (see CLAY, FLINT, LIME, &c.) we cannot in this place enlarge upon the subject.

EARTH-BANKS, in husbandry, are a kind of fence, very common in the vicinity of London, and in several other parts of England: where stones cannot be easily procured, they are preferable to other fences, both for soundness and durability.

The best method of making earth-banks is, to dig up some turfs in a spot abounding with grass, about a spit deep, and four or five inches thick: these are to be laid even on one side by a line, with the grass outwards, and on the back of them is to be placed another row of turf, leaving the space of one foot of solid ground on the outside, to prevent the bank from slipping in, lest any part of it should be deficient. On the outside of this, a ditch is to be dug; otherwise, both the sides must be made with a slope two feet in depth, which, however, will be no detriment, as they will both produce pasture.

The soil dug out of the ditches, or from the slopes, should be thrown in, between the two rows of turf, till the whole is made level, in a similar manner, and the bank is raised to the height of four or more feet, at the same time increasing the width of the foundation, in proportion to the height. As the bank ascends, both sides must be made to slope naturally, so that the top shall be about $2\frac{1}{2}$ feet in width.

There is one caution necessary to be observed in constructing this kind of fence; that is, never to raise it during the dry seasons, because, if violent rains should follow, the earth contained between the sods would swell, burst out, and destroy the beauty and solidity of the bank. The top may be planted with quick, which, if repeatedly clipped, will grow very thick, and afford excellent shelter for cattle.

EARTH-NUT, a native plant of two species, namely, the *Bunium bulbocastanum*, or GREAT EARTH-NUT; and the *flexuosum*, or COMMON EARTH-NUT, or Pig-nut. Both are perennial plants, growing in sandy or gravelly meadows, pas-

tures, orchards, and woods: they flower in the month of May or June.

The roots of these plants are at present searched for only by hogs, which devour them with avidity; but as they are very little inferior to chesnuts, we think they might form an agreeable addition to our winter desserts, and be eaten either raw, boiled, or roasted.

[The earth-nut, or ground-nut, of the southern United States, is the *Arachis hypogæa*, L. They are also called *pinda* by the negroes, by whom they are chiefly cultivated. They are a sort of dwarf-pea: after the blossom falls off, the young fruit turns down, and enters the earth, which is carefully heaped about the plant. When ripe, a cylindrical shaped husk, contains generally two beans, which, when slightly toasted in a hot oven in the husks, are pleasant eating, being sweet and oily. Mr. W. BARTRAM informs the editor, that a preparation of these kernels, combined principally with the dry bark of sassafras pulverised, is an excellent substitute for chocolate. In Cochin-China, the oil of the arachis is used for lamps, and as a substitute for olive oil. It thrives best in a sandy soil.]

EARTHQUAKE, is a sudden and violent concussion of the earth, which is generally attended with uncommon noise, both in the air, and under ground; in consequence of which, whole cities are at once levelled, as well as rocks; the course of rivers is altered; and the most dreadful devastations are thus occasioned.

There is no phenomenon in nature, more calculated to impress the human mind with awe, than an earthquake; but it has not till lately been investigated with philosophical precision, and the history of these events still remains very incomplete.

Of the observations, which indefatigable naturalists have been able to collect, the following are the principal: 1. Where there are any volcanoes or burning mountains, earthquakes may naturally be expected to occur more frequently, than in other countries. 2. Earthquakes are, in general, preceded by long droughts; but they do not always happen immediately after them. 3. They are, likewise, frequently indicated by certain electrical appearances in the atmosphere, namely, the *aurora borealis*, the falling of stars, &c. 4. A short time previous to the shock, the sea swells with a loud noise; fountains are disturbed, and become muddy; and the irrational animals appear frightened, as if conscious of approaching calamity. 5. The air, at the time of the shock, is in general, very calm and serene; but afterwards becomes dark and cloudy. 6. The concussion begins with a rumbling noise, similar to that of carriages: a rushing sound resembling the wind is sometimes heard; at others, explosions not unlike the firing of cannon; and the ground is agitated in different directions. A single shock seldom exceeds a minute in its duration; but frequent concussions succeed each other, at short intervals, for a considerable length of time. 7. During the shock, chasms are made in the earth, whence flames, but oftener vast quantities of water, are discharged. Flames and smoke are also emitted from spots of ground where no chasms are perceptible; and though the abysses formed in the earth are in general not exten-

sive, yet in violent earthquakes they are frequently so large as to bury whole cities. 8. The water of the ocean is, on such occasions, affected perhaps still more than the land; the sea now rising to a prodigious height, now divided to a considerable depth, and emitting great quantities of air, flames, and smoke. Similar agitations occur in the waters of ponds, lakes, and even rivers.

Lastly, the effects of earthquakes are not confined to one particular district or country, and frequently extend to very distant regions; though there is no instance of the whole globe having been convulsed at the same time.

The cause of earthquakes, or the theory of this tremendous phenomenon, is but imperfectly understood. It is, however, certain, that they arise from the confinement of air within the bowels of the earth, where it is generated by sulphureous vapours acting on different metallic ores, the principal and most copious of which appears to be *iron*. In confirmation of this theory, we shall only observe, that *artificial earthquakes* may be easily produced, by burying equal quantities of iron-filings and sulphur, mixed in a moist state, and confined in a vessel, so as to exclude the access of external air, and prevent the escape of the inflammable gas thus generated. In a few days (and, if large quantities be employed, in a few hours) this composition grows remarkably hot, and will explode with a violence and impetuosity resembling the natural phenomenon: but we do not advise our junior readers to attempt such dangerous experiments ....As it would be deviating from our plan to enter into farther particulars, we can only refer the inquisitive to the 73d vol. of the "*Philosophical Transactions*" of the Royal Society, for 1783, where they will find an ample account of the latest and most awful earthquakes that have happened in Europe, within the memory of man.

EARTH-WORM, or *Lumbricus*, L. a well known insect, which is destitute of feet; it is of an oblong form; round shape, and covered with a soft, slender skin, marked with annular ridges and furrows. It is common in all parts of this country, at little depths beneath the surface of the earth; and is not unfrequently found in the human intestines, as well as in those of the lower animals; in which state it has been supposed to be a different creature, and is therefore called by various names. See WORMS.

Earth-worms were formerly reputed to be of great virtue in medicine; but are at present more usefully employed in feeding poultry and other birds.

EAU-DE-LUCE, a kind of liquid volatile soap, of a strong pungent smell, which is prepared in the following manner: 10 or 12 grs. of white soap are dissolved in 4 oz. of rectified spirit of wine; after which the solution is strained. A dram of rectified oil of amber is then added, and the whole filtrated; with this solution should be mixed such a proportion of the strongest volatile spirit of sal-ammoniac, in a chrystal glass bottle, as will, when sufficiently shaken, produce a beautiful milk-white liquor. If a kind of cream should settle on the surface, it will be requisite to add a small quantity of the spirituous solution of soap....Those who may wish to have this liquor

perfumed, may employ lavender, or Hungary water, instead of the spirit of wine.

The celebrated composition is, however, seldom obtained in a genuine state, when purchased at the shops. Its use, as an external remedy, is very extensive; for it has not only been employed for curing the bites of vipers, wasps, bees, gnats, ants, and other insects, but also for burns, and even the bite of a mad-dog, though not always with uniform success. Besides, it affords one of the safest stimulants in cases of suffocation from mephitic vapours, and in that state of apoplexy (which see), termed *serous*, as likewise after excessive intoxication, and in all those paralytic complaints, where the vessels of the skin, or the muscular fibre, require to be excited into action.... Nevertheless, it ought to be used with due precaution.

EBONY, an exceedingly hard and heavy wood, imported from the East-Indies; it admits of being very highly polished, for which reason it is used chiefly for veneering cabinets, in Mosaic work, &c.

Ebony is of various colours, viz. black, red, and green; but the first is that mostly generally known, and used. Cabinet-makers, inlayers, and others, frequently substitute pear-tree, and other wood, for ebony, by giving the former a black colour; which some effect by was hing it in a hot decoction of gall-nuts, and after it is dry, by rubbing it over with ink, and polishing it by means of a hard brush and a little wax: others heat, or almost burn their wood, till it become black, so that it acquires such a degree of hardness, that, when properly polished, it can with difficulty be distinguished from genuine ebony.

ECONOMY, a term of extensive signification, and if its meaning be properly understood and practised, the result cannot fail to be attended with the happiest effects. It is, in particular, applied to *rural*, *domestic*, *animal*, *political*, and other objects, but more generally to the two first mentioned, which form the basis of the present work.

As, by our plan, we are confined to the alphabetical order, in which the different subjects of economy are discussed, according to their greater or less importance, we cannot, consistently, enlarge upon its *theory*. Those readers who are seriously inclined to adopt *practical* rules of economy and frugality, will consult the particular articles connected with these measures: others, who wish to acquire more extensive information on rural and domestic economy in general, will be highly gratified by the perusal of Mr. J. BANNISTER's *Synopsis of Husbandry*, (8vo. 9s. 1800) and especially the collection of the *Reports of the Society for bettering the Condition of the Poor*; a work which merits a place in every family library.

[EDDOES, a variety of the ARUM ESCULENTUM, L. Another variety, is the TANNIERS. Both these resemble each other, except that eddoes are smaller, more acrid, and require longer boiling than tanniers. They are planted in South-Carolina, in the latter end of March, in small beds, or hills, three or four feet apart; the leaves are very large, from eighteen inches to two feet long, and from twelve to fifteen inches wide. For seed-plants, the small fruit of the last year, or the larger fruit, cut in two, is planted. During the

growth, the earth is drawn up once or twice around the root, and the grass hoed from them; they are dug in before the heavy frosts commence, and put away in cellars, covered with earth and straw, or pine leaves. They are excellent, when boiled and eaten with butter, like yams. A rich mellow soil, inclining to moist, such as is generally found along declivities of land, just before it becomes wet and boggy, answers best for eddoes and tanniers.]

EDGED Tools: See TOOLS.

EDIFICES: See BUILDING; COUNTRY-houses; and FARM-house.

EDUCATION, is the art of rearing, forming, and instructing children, according to the most appropriate rules and maxims..... Many volumes have, from time to time, been published on this most important subject; and though almost every writer aims at giving to the public a system peculiar to himself, yet all agree that the grand object of education is the *gradual improvement of our moral, physical, and intellectual faculties*..... Thus it happens, that the *means* to be adopted for obtaining this salutary end, constitute all the difference of opinion prevailing among men. It would lead us too far from our limits to lay down only the general principles by which a good and rational education ought to be regulated. And as this subject has lately been investigated by the editor of these pages, in the Preliminary Lectures to Doctor STRUVE's *Familiar Treatise on Education;* besides which, there have been published several useful works, that are briefly reviewed in those lectures; the curious reader will probably avail himself of the original sources, from which we have no room to insert copious extracts.

EEL, or *Muræna*, L. a genus of fish, comprising seven species, two of which only are found in the waters of this country; namely,

1. The *Anguilla*, or Common Eel, which is very frequent in all our fresh waters, ponds, ditches, and rivers. This is a very singular creature, and in some respects partakes of the nature of reptiles; being known to quit its element, and to wander during the night along the meadows, both to change its habitation, and to obtain prey; feeding on snails as it glides along. During winter, the common eel buries itself deeply in the mud, where it continues in a torpid state, similar to that of serpents. It is extremely sensible of cold, and will eagerly take shelter in a wisp of straw thrown into a pond in severe weather, which stratagem has been successfully practised to catch these fish during the winter season.

Eels are exceedingly voracious, and destructive to the fry of other fish; and are remarkable for their tenacity of life, as their dissevered parts move for a considerable time after they are flayed. Common eels grow to a large size, sometimes weighing 15 or 20lbs.; but are, in general, from 1 ½ to 2 feet in length....Their fat is reputed to be vulnerary, and has been recommended externally in cases of deafness, and in the hemorrhoids..... When this fish is half fried, and its fat carefully expressed and clarified, the *oil of eels* is the most subtle for watches, and other diminutive machinery; as it never thickens, and consequently preserves the iron from the effects of rust.

2. The *Conger*, or CONGER-EEL, grows to an uncommon size, and is found chiefly on the coast of Cornwall, where great numbers of them are taken, and when slit, are hung on a frame to dry, and then exported. Conger-eels are sometimes 100lbs. in weight, and extremely voracious, preying on other fish, as well as on crabs, when these have cast their shells, and are in a soft state....Being exceedingly fond of carcases of any kind, their flesh, though difficult of digestion, is very agreeable, and in great request among epicures. Persons afflicted with nervous, asthmatic, and consumptive disorders, ought, however, carefully to abstain from eel-pies, or any dishes prepared of that luxurious fish.

EGG, a body formed in certain female animals, and which contains an embryo or fetus, beneath a cortical surface, or shell. This shell is lined throughout with a thin, but tough membrane, which, dividing at or near the obtuse end of the egg, forms a small bag, and contains what is called the *albumen*, or white, and the *vitellus*, or yolk.

The chick in the egg is first nourished by the white, and when that is consumed, by the yolk.... A short time before the exclusion of the animal, the whole of the yolk is taken into its abdomen, and the shell, at the obtuse end, frequently appears cracked, which is occasioned by the instinctive operation of the beak.

Eggs vary much in their colour, size, and form, according to the birds that deposit them, and the different modes of dressing them. Those chiefly used for culinary purposes are the new laid eggs of hens, being without exception the most wholesome.

Eggs are an agreeable and nourishing food; but they ought to be perfectly fresh, and gradually coagulated in hot water, from 5 to 10 minutes, instead of being boiled. To ascertain whether they have been well preserved, it is only necessary to examine their transparency by a candle, and to reject all such as appear of a turbid colour: fresh eggs also, on being exposed to the fire, will exhale a perceptible moisture.

Among the various methods contrived, of preserving eggs for the winter season, the chief requisite is to exclude every access to the air. For this purpose, solutions of lime, with the addition of alkalis, have been employed; but these, as well as the varnishing of eggs with wax, are too expensive for general use. The greasing of eggs with unctuous substances, such as mutton fat, oil, &c. has also been practised; but it is neither cleanly, nor calculated to effect the object intended. One of the best methods, seems to be that of covering the eggs with a cheap varnish, by which the air will be prevented from penetrating the pores; or of suspending them in running water, by means of a net.

[Eggs are very easily preserved by putting them in a keg of salt, in a cool place, and by turning the keg every day. Probably dipping them in melted tallow, (of which Dr. W. speaks too lightly), would tend to increase the preservative power of the salt. The eggs ought to be as fresh as possible, when put up.]

The shells of eggs serve for various purposes, but chiefly as a

colour; when finely levigated, they are preferred to flake-white. They are prepared by peeling off the inner skin, and after being finely pulverized, the powder is carefully washed....See COLOUR-MAKING.

The yolks of eggs are employed in different medicinal ways, but most frequently in emulsions. One yolk, if gradually beaten up with three ounces of pure water, and reduced to the utmost degree of thinness, has been found of great utility in removing contractions of the limbs. The whites are chiefly applied externally, in the preparation of eye-waters, on account of their cooling, agglutinating, and astringent qualities. They have also been used with advantage, in burns, and are recommended as a specific for the jaundice, of which we have had no experience.

In February, 1791, a patent was granted to Mr. WILLIAM JAYNE, for his composition, which is calculated to preserve eggs....He directs one Winchester bushel of quick-lime, 32 oz. of salt, and 8 oz. of cream of tartar, to be incorporated with such a quantity of water as will reduce the mixture to that consistence, in which an egg will float with its top above the surface....In this liquor the eggs are to be kept; and the patentee asserts, that they may thus be preserved perfectly sound, for the space of two years at the least.

ELDER, or *Sambucus*, L. a genus of plants consisting of 6 species, two of which are indigenous.

1. The *Ebulus*, DWARF ELDER, or Dane-wort, which is perennial, grows in hedges and on road sides, and flowers in the month of July. The green leaves of this plant are said to expel mice from granaries: neither hogs, cows, goats, sheep, nor horses will eat them....Its berries impart a violet colour, and their juice mixed with vinegar dyes raw linen, as well as Morocco leather, of an azure blue....In its medicinal effects it is more violent than the following species, and therefore requires greater caution.

2. The *nigra*, or COMMON ELDER, which thrives in woods, and damp hedges. In May or June it produces white flowers, which are succeeded by black berries....This plant is extensively useful: its wood being hard and tough, is made into meat-skewers, tops for angling rods, and needles for weaving nets; it is also employed by turners, as it works extremely well on the lathe....The leaves are eaten by sheep, to which it is of great service, when diseased with the rot; for, if placed in a situation where they can easily reach the bark and young shoots, they will speedily cure themselves. According to LINNAEUS, the plant is refused by horses, cows, and goats, though others assert, that cows eat it eagerly.

Every part of this, as well as of the preceding species, has a narcotic smell, which ought to caution persons against sleeping beneath its shade...The inner green bark, is an ingredient in the black dye; it is likewise purgative, and may be used with advantage where strong laxatives become requisite. In small doses it is diuretic, and has been successfully used in glandular obstructions, and in dropsies. The leaves are possessed of cathartic properties similar to those of the bark, but are more nauseous. They form an ingredient in several cooling ointments: and if turnips, cabbages, fruit-trees, or corn, be whipped with them, and also with

the green boughs, they will be effectually secured against the depredations of turnip-flies, caterpillars, and other noxious insects, with which those vegetables are infested....The flowers are sometimes infused to impart a flavour to vinegar; but should on no account be given to turkies, as they will prove fatal to those birds....The berries are likewise poisonous to poultry; but their juice, when boiled down to an extract, and sweetened with sugar, (this composition being termed *rob*), is a gentle aperient, and promotes perspiration. The juice is likewise converted into a pleasant liquor called *elder-wine*, and is also employed to communicate a red colour to raisin or sweet wines....DAMBOURNEY observes, that linen may be dyed of a brown colour with the juice of these berries; and that wool, previously managed with bismuth, acquires a beautiful blueish grey, which is very permanent....In Germany, a very pure and strong spirit is distilled from this fruit, especially after it has been sweetened by night-frosts.

On the trunk of the common elder frequently appears a fungous excrescence, wrinkled, and turned up like an ear, whitish on the outside, black within, and intersected with several small veins....These are commonly called *Jew's ears*, and are reputed to be serviceable for inflammations and swellings of the tonsils; for sore throats, and quinsies.

[The following receipt to make elder-wine was forwarded by a friend, S. W. J. Esq. who has followed it for many years:

Take twelve and a half galls. of the juice of the ripe elder-berry, and 37 $\frac{1}{2}$ gallons of water that has been recently boiled, and to every gallon of water add 3 $\frac{1}{2}$lbs. sugar, or 4 $\frac{1}{2}$lbs. Havannah honey, which will incorporate while warm. Add of ginger $\frac{1}{2}$ oz. and pimento $\frac{3}{4}$ oz. to every four gallons of the mixture, and when the whole is cooled to about 60° of FAHRENHEIT, add about $\frac{1}{2}$ pint brewer's yeast, and let it ferment very slowly for about 14 days, the bung being out, and letting it stand six months; then bottle it off. This wine is a most excellent cordial.]

ELECAMPANE, or *Inula*, L. a genus of plants, consisting of thirty species, of which four only are indigenous, and the principal of these is the *Helenium*, or COMMON ELECAMPANE; which is perennial, abounds in moist meadows and pastures, and flowers in July or August. It is eaten by horses and goats, but refused by hogs:....its roots, when bruised and macerated in urine with balls of ashes and whortle-berries, dye a blue colour: when dry they possess an aromatic smell, and, on chewing them, become acrid and pungent: they are likewise in some repute for promoting expectorations in asthmas and coughs. If liberally taken, they are diuretic, and said to be of great service in removing visceral obstructions....A decoction of this plant has been employed by farmers for the cure of the scab in sheep; and, externally applied, for removing disorders of the skin.... Prof. KNACKSTAEDT, of St. Petersburgh, has lately prescribed the elecampane both ways, and found it a remedy of singular efficacy, in curing the scald head, itch, &c.

ELECTRICITY, is the power of attracting light substances, &c. when excited by heat, or friction; and which may be communicated

to other bodies. This term also implies that branch of natural philosophy which investigates the nature and effects of this power, and of other elementary agents connected with it.

The science of electricity has made a most rapid progress within the last fifty years; it was little attended to previous to the year 1600, since which period it has been carried to a considerable degree of perfection....It would be transgressing our limits to enter into the history of this subject, as few can be ignorant of the names of NEWTON, GREY, DE FAY, PRIESTLEY, FRANKLIN, and CAVALLO: farther, as the theory is too diffuse, and requires the aid of too many experiments and analytical explanations, we shall confine our account to *medical electricity*. This has often been successfully employed for relieving the human frame from painful maladies, though it has till lately been treated as an empirical process. Being one of the most powerful stimulants, its effects may be considered both as general and local. When the vital principle is in a manner extinguished by too violent shocks, it may again be kindled or excited by such as are less powerful.... Hence electricity promotes a free circulation of the fluids, and particularly the blood; increases animal heat, perspiration, as well as all the secretions and excretions of the body.

As many *professional electricians* are little concerned about the propriety or safety of this potent remedy, when patients apply to them as candidates for the operation, we think it our duty to give the following practical hints: 1. Electricity is always improper in active, inflammatory, or *sthenic* diseases: 2. It is also hurtful when a high degree of excitement is felt in the organs of sense, as well as in those of voluntary motion, and when both are accompanied with relaxation or debility: 3. If any local irritation prevail in the body, such as ulcers, inflammatory tumors, eruptions of the skin, &c. In these cases, the electric stimulus has a direct tendency to produce congestions, or a local accumulation of humours. It has, however, sometimes been found highly beneficial in removing the periodical obstructions of females, though its application requires great precaution. In passive, chronical, or *asthenic* disorders, it has likewise been of considerable service; but the mode of imparting the electric fluid deserves more attention than has, in general, hitherto been bestowed upon it; and violent shocks, for the sake of experiment, ought never to be communicated, where less powerful ones might be sufficient. Thus, the *electric bath*, and the gentle application of sparks to any particular part of the body, under the conditions before stated, are equally safe, and advantageous. On the contrary, the more violent methods of electrifying have so often been attended with mischievous effects, that they ought to be applied to those persons only, whose capacity of receiving external impressions is diminished, and whose excitability is in a languid state.

Deafness, paralysis, head, and tooth-achs, however obstinate, have frequently yielded to the powerful effects of electricity. Similar success has attended its application to parts affected with the cramp, gouty and rheumatic pains, palsy, and sometimes even epilepsy; be-

sides which, moderate electric shocks have, in various instances, contributed to the resuscitation of persons whose vital functions were destroyed by drowning: it ought nevertheless, to be resorted to only in particular cases, and under the immediate inspection of a medical practitioner.

For an account of the different medical apparatus employed, and the various modes of electrifying, we refer the curious reader to the late Mr. ADAM's "*Essays on Electricity and Magnetism*," (8vo. 9*s*.) He will also find much valuable information in Dr. PRIESTLEY's "*History of Electricity*," (4to. 1775, or 2 vols. 8vo. 1*l*. 1*s*.) and in Mr. CAVALLO's "*Treatise on Electricity*," 3 vols. 8vo. 18*s*.

ELECTUARY, a form of medicine, consisting of powders, or other ingredients, incorporated with honey, conserve, or syrup: it is divided into doses, to be taken as circumstances may require.

Electuaries are composed principally of the milder medicines, which are more pleasing to the palate. The more powerful drugs, as emetics, opiates, &c. are seldom administered in this form, on account of the uncertainty of the dose. Acid, bitter, and fetid substances, should never be given as electuaries; nor is this form well calculated for mercurial, and other ponderous matters, which are apt to subside.

The lighter powders require thrice their weight of honey, or syrup boiled to the consistency of that drug, in order to convert them into an electuary....If syrups of the common consistence be employed, double their weight to that of the powder will be sufficient. A very cheap and excellent substitute for either sugar or syrup in making electuaries, might be obtained by baking unripe pears in close vessels, with the addition of a little soft sugar, by which means a considerable portion of saccharine juice may be readily obtained.

The quantity of an electuary, to be administered at one dose, varies according to its component parts; but it seldom exceeds a large tea-spoonful, or two drams.

ELEPHANT, a well known animal, which is a native of India, and the southern parts of Africa. It is the largest of all quadrupeds, and generally about 16 feet in length from the front to the tail; 25 feet from the end of the trunk, and about 14 feet high. It has no fore-teeth in either jaw; but its dog-teeth are very long, and afford the beautiful ivory, which is converted into combs and other useful articles. It is also provided with a long pliable proboscis, or snout, with which it can seize any objects, and also convey its liquid nutriment to the mouth.

Elephants are remarkable for their uncommon sagacity, as well as their social disposition. When tamed they are the most friendly of all animals, and can easily distinguish their master's or driver's voice. They are sensible of the language of anger, of command, and of satisfaction, so that they act accordingly. They receive orders with attention, and execute them with precision and alacrity, bowing themselves for the convenience of those who wish to mount them; raising burthens with their trunk; and laying them on their back. These animals delight in shining harness and trappings; though when yoked in a cart or waggon, they draw cheerfully, un-

less abused by unjust chastisement, in which case they seldom fail to take vengeance on their tyrannical master.

If the elephant be properly managed, he attains a very considerable age; even though employed in servitude and labour. Several instances have occurred, in which these creatures have reached the age of 130 years in captivity; and in a natural state, they often exceed 200 years: their full growth is said to require not less than 30 years....The flesh, gall, skin, and bones of elephants, are used medically by the Chinese....See also IVORY.

ELIXIR: See TINCTURE.

ELM-TREE, the COMMON, or *Ulmus Campestris*, L. an indigenous tree, growing chiefly in a loose soil of hedge-rows, and abounding in the more southern parts of this country....its flowers have a pleasant smell, similar to that of violets, and blow in the month of April.

This wood may be propagated by the seed, and by layers or suckers taken from the roots of old trees: those raised from layers, always strike better roots, thrive more quickly than the other, and do not shoot forth so many suckers; for which reason this method deserves to be more generally practised.

The elm naturally delights in a stiff, strong soil, where it grows comparatively slow; but if it be planted in rich, light land, it vegetates most luxuriantly. In the latter case, however, its wood is light, porous, and of but little value compared with that produced on richer soils: the latter is of a closer and stronger texture, and possesses near the heart, the colour and almost the weight and hardness of iron. On such lands, therefore, the elm becomes very profitable, and is one of those deciduous trees which ought to be industriously cultivated.

This beautiful tree is of great value; and well adapted for planting shady walks, as it does not destroy the grass, and its leaves are relished by horses, cows, goats, hogs, and sheep, all of which eat them eagerly. Its wood, being hard and tough, is used for making axle-trees, mill-wheels, keels of boats, chairs, and coffins: it is also frequently changed by art, so as completely to resemble mahogany; for this purpose it is sawed into thick planks, stained with aqua-fortis, and rubbed over with a tincture, of which alkanet, aloes, and spirit of wine, are the principle ingredients.

This plant affords subsistence to a variety of insects that prey upon it, but more particularly to the *aphis* of the elm, which generally causes the leaves to curl, so as to make them a secure shelter against the weather. No effectual method of extirpating them has hitherto been devised. Silk-worms devour the leaves with great avidity; and though we doubt whether they afford wholesome food to these insects, yet when alternately given or mixed with lettuce, elm-leaves may become an useful substitute, in situations where the mulberry-tree is scarce.

A decoction of the inner bark of the elm-tree, if drunk freely, has sometimes procured relief in inveterate dropsies. It has a bitterish taste, and abounds with a slimy juice, which is recommended in nephritic cases, and also externally as an useful application to burns. The outer bark is bitter, contains but little mucilage, and is

totally destitute both of smell and taste. The internal bark of the branches is more bitter than that of the trunk, and is, probably on that account, more efficacious....It is chiefly used for cutaneous complaints, such as the herpes, or shingles, and the leprosy.

[We have two species of the *ulmus*, or elm, in the United States, viz. the red, or slippery elm; the *Ulmus Americana*, or American roughed leaved elm of Marshall, [*Ulmus Rubra* of Muhlenburg;] 2d, *Ulmus Molifolia*, American soft-leaved elm.

The first mentioned species, on account of its many valuable properties, deserves particular mention. It rises to the height of 30 feet, with a pretty strong trunk, dividing into many branches, and covered with a light coloured rough bark. The leaves are oblong, oval, and sharp pointed, unequally sawed on their edges, unequal at the base, very rough on their upper surface, and hairy underneath. The flowers are produced thick upon the branches, upon short, collected footstalks, and are succeeded by oval, compressed, membranaceous seed-vessels, with entire margins, containing one oval compressed seed. The inner bark, by infusion or gentle boiling in water, affords a great quantity of insipid mucous substance, that is applicable to a variety of important uses. Dr. Mitchell says he has eaten it repeatedly, and found it to agree with him perfectly well; and when mixed with sugar or lemon juice, it became very palatable. This fact may be of service to travellers who may lose their way in our wilds. Dr. M. says it has been beneficially administered in catarrhs, pleurisies, and quinsies; it has been applied as a poultice to tumours, and as a liniment to chaps and festers....*Letter to Dr. North, Amer. Museum, vol.* 7.

Dr. Joseph Strong, of Philadelphia, communicated to the Editor some facts respecting the medicinal qualities of this mucilage, which deserve serious attention from the physicians of the United States. He states that, during the time he served as surgeon in the western army, he experienced the most happy effects from the application of poultices of the elm bark to gun-shot wounds, which were soon brought to a good suppuration, and to a disposition to heal. It was applied as the first remedy. When tendency to mortification was evident, this bark bruised, and boiled in water, produced the most surprising good effects. After repeated comparative experiments with other emollient applications, as milk and bread, and linseed poultice, its superiority was firmly established. He thinks that the mucilage is slightly sweet. He particularly stated the cases of the wounded in the action in which general Wayne defeated the Indians in August 1794, as proving, in the most evident manner, the beneficial effects of the poultice. In old ill-conditioned ulcers, in fresh burns, equal benefit was derived from it. In diarrhæas and dysenteries, the infusion of the bark was used with advantage as a diet drink. A soldier, who lost his way, supported himself for ten days upon this mucilage and sassafras. The red elm tree may be considered as a highly valuable addition to our stock of medicines, exclusively American, and ought to be carefully searched

for by the medical gentlemen in the country, and preserved from the indiscriminate axe. No farmer should permit this tree to be cut off his plantation, and the young trees should be transplanted from the woods to the vicinity of the house. When the inner bark is taken away for medicinal purposes, it would be well to try to renew the external bark by means of the application of cow-dung, sand, and lime, as directed and practised by FORSYTH on fruit-trees, with so much success. It is highly probable that, by keeping out the weather, the bark would be renewed, and thus the tree saved.]

DAMBOURNEY obtained from the bark of this tree, a yellow-brownish colour in dyeing; and DE VILETTE manufactured of it a strong brown paper.

ELOCUTION, generally speaking, signifies the selecting and adapting of words and sentences, to the things or sentiments intended to be expressed. It is also used to denote the just and graceful management of the voice, countenance, and gesture, when speaking: in which sense it is synonimous with what is variously called a good delivery, eloquence, or the art of speaking and writing with accuracy, elegance, and perspicuity.

True eloquence depends principally on the vivacity of the imagination; for it not only communicates grace and ornament, but also life and motion to discourse. It would be deviating from our plan, to specify the various component parts of elocution, viz. emphasis, pauses, tones, &c. we must, therefore, refer the reader to Mr. SHERIDAN'S "*Lectures on Elocution*," (8vo. 7s.) and to Mr. WALKER'S "*Elements of Elocution*," (8vo. 2 vols. 12s.) in the latter of which, in particular, he will find excellent and perspicuous rules concerning this subject.....Many pertinent observations on the elocution or eloquence of the bar, are contained in the elegant work, entitled, "*The Study and the Practice of the Law considered in their various relations to Society*," (8vo. 6s.)....Some judicious remarks on the eloquence of the pulpit, in this country, occur in an essay on this subject, prefixed to "*Select Sermons*," translated from the French of BOSSUET (12mo. 3s.) and which, it is supposed, come from the elegant pen of Mr. JERNINGHAM.

EMBANKMENT: *vid.* SEA.

EMBROIDERY, a work in gold, silver, or silk-thread, wrought by the needle upon cloth, stuffs, or muslin, into various figures.

In the embroidery of stuffs, the work is performed in a frame, as the easy manner of working them depends upon the proper expansion of the piece. Muslin is spread upon a pattern, on which the figures intended to be wrought, are delineated. Embroidery on the loom is less tedious than the other method, in which, while the flowers are working, it becomes necessary to count all the threads of the muslin; this latter mode, however, is much richer in points, and is likewise susceptible of greater variety. Cloths which are milled too much, will not easily admit of such ornament. The thinnest and finest muslins only are left for this purpose, and are embroidered to the greatest perfection in Saxony. Of late years, this work has been attempted in England and Scotland; but it has not yet arrived at that degree of perfection to which

it has been carried in France and Germany.

There are various kinds of embroidery, namely, 1. Embroidery on the *stamp;* where the figures are raised and *rounded*, cotton or parchment being placed beneath, in order to support them. 2. *Low* embroidery; in which the silver or gold *lies low* upon the sketch or pattern, and is stitched with silk of the same colour. *Guimped* embroidery, which is performed either in gold or silver: a design is first made upon the cloth, and then placed on cut vellum; after which the gold or silver is sown on with silk-thread. 4. Embroidery *on both sides;* which is thus denominated, from its appearing on both sides of the stuff. 5. *Plain* embroidery; where the figures are flat and even, being totally destitute of ornaments.

By the statute 22 GEO. II. c. 36, no foreign embroidery, or gold or silver brocade, shall be imported, on pain of being forfeited and burnt, and a fine of 100*l.* for every piece. Nor shall any person sell or expose to sale, any foreign embroidery, gold, or silver thread, lace, fringe, brocade, &c. or make the same up into any garment, on pain of having it forfeited and burnt, and of paying a penalty of 100*l.*: the mercer, or other person in whose custody it may be found, incurs a similar fine.

EMERALD, a genus of precious stones belonging to the order of *siliceous* earth. This is perhaps the most beautiful of all the gems: when heated in fire, it changes its colours to a deep blue, and becomes phosphorescent; it resumes its natural green on growing cold.

Emeralds are divided by jewellers into two classes or kinds, namely, the *oriental* and the *occidental*. The former is at present extremely scarce, being found only in the kingdom of Cambay, in India. The *occidental* emeralds are chiefly imported from Peru, in South America. A very inferior sort is also obtained from Silesia, which, however, is little esteemed.

Genuine emeralds being seldom to be met with, several experiments have been made, and directions given for imitating them; from which we select the following: Take of natural crystal and of red lead, each 4 ounces; verdigrease 48 grains; and of crocus martis, prepared with vinegar, 8 grains. The whole is to be finely pulverised, sifted, and put into a crucible, the space of one inch being left empty. It is then to be well luted, set in a potter's furnace, and left for the same space of time as earthen ware. When cool, the crucible is to be broken, and these ingredients will be found converted into a mass of a fine emerald colour; which, after being properly cut and set in gold, will at least be equal, if not superior, to genuine oriental emeralds.

EMERY, a kind of metallic stone, found in several mines, but chiefly in those of iron, being a species of rich ore. It is usually of a dusky brownish red on the surface; but, when broken, is of a fine bright reddish iron-grey, spangled with glittering specks; which are in a considerable degree impregnated with that metal. It is also sometimes red, when it usually contains veins of gold.

This stone, or ore, is divided into three sorts, namely, the *Spanish*, the *red*, and the *common* emery. The first is found in the gold

mines of Peru, and is interspersed with small veins and specks of gold; whence it is conjectured to be a kind of ore of that rich metal, and is prohibited to be exported. From the experiments made by naturalists, it appears to be the metal called PLATINA, to which we refer.... The *red* emery is discovered in copper-mines, chiefly in Denmark and Sweden; whence a small quantity is imported. The *common* emery is dug up in great abundance in the island of Guernsey. It is also obtained from some iron-mines in England, and is the only sort which is consumed in very considerable quantities, by locksmiths, glaziers, lapidaries, masons, cutlers, and others, who employ it for cutting and polishing glass, marble, and precious stones; as well as for the polishing and burnishing of articles made of iron and steel. This species of emery is of a brownish colour, inclining to red; is extremely hard, and consequently, very difficult to be reduced to powder; an art which has been discovered in this country, and is effected by means of certain mills, invented for the purpose: when pulverized, it forms a considerable article of exportation. This native ore, when fused with lead or iron, possesses the property of hardening those metals. It is also said to increase the weight, and heighten the colour of gold....It deserves no notice either as an internal medicine, or as a dentrifice.

EMETICS are those medicines which are either given with a view to discharge the foul or poisoned contents of the stomach, or to vellicate the coats of that organ, and thus to produce certain changes in other parts of the animal economy, not immediately connected with the process of digestion. With the latter intention, small nauseating doses are generally administered, especially in catarrhal and other diseases of the breast. In this place, however, we shall but briefly enumerate the cases in which vomiting may be excited, with a probability of success; and also, those instances in which this remedy cannot be safely adopted.

Emetics may be of great service: 1. Immediately after swallowing narcotic and other poisons (see Antidotes, vol. i.); 2. For the purpose of evacuating viscid, bilious, and putrid matters, or undigested food from the stomach; 3. To assist nature, when there is a spontaneous effort to vomit; 4. To expel substances fallen into and obstructing the passage of the gullet; 5. To promote the expectoration of mucus and purulent matter, collected in the lungs and wind-pipe; as well as on many other occasions.

On the contrary, the greatest precaution is required in the following cases, where a precipitate use of emetics may be attended with fatal effects, from bursting a blood vessel, &c. 1. In all plethoric persons, but especially such as perceive a strong propulsion of the blood to the head, breast, stomach, or liver; 2. In actual inflammation of the intestines; 3. In states of extreme languor and debility; 4. In every species of ruptures, and prolapses; 5. In violent pain proceeding from stones confined in the bilious or urinary passages; 6. In obstructions of the bowels, and other abdominal parts; 7. In persons of very rigid fibres, for instance, the aged and emaciated; 8. In a very weak or affected state of the lungs, liver and stomach;

9. In a deformed structure of the body, or some particular parts; for which reason emetics might prove dangerous to persons troubled with a hump-back, a very short neck, narrow chest, &c.

Having stated the principal circumstances, which either indicate or prohibit the taking of emetics, we trust the reader will agree with us, that they are potent remedies, and that it requires the judgment of an expert and medical practitioner to determine their utility.

With respect to the different substances employed to induce vomiting, we refer to those heads of the alphabet, under which they are treated, such as IPECACUANHA, TARTAR Emetic, &c....One of the mildest emetics may be made, according to Dr. LIND, by plunging red-hot pebbles into weak wine, or flint-glass thus heated into cold water; a tea-spoonful of either may be taken every five or ten minutes, till it produces the desired effect. Another easy way to induce vomiting, is, a strong infusion of green tea, drunk lukewarm, without milk or sugar, and assisted by the occasional irritation of the fauces and larynx, by means of a soft feather. See VOMITING.

EMOLLIENTS are those medicines, which are supposed to soften and relax the fibres of the body, either by mechanically distending such as before were too closely, that is, preternaturally combined; or, by penetrating into the interstices of the elementary fibres, and supplying those particles, from a deficiency of which they were too intimately united. Among the remedies of the former class, are chiefly *heat*, and all unctuous applications; such as lard, wax, fat of venison, &c. to the latter belong all juicy, mucilaginous, and saccharine substances, serving both as nutriment and medicines. Of this description are the expressed vegetable oils, fresh butter, decoctions of the marsh-mallows, infusions of linseed, &c.

Emollients are indicated: 1. When the fibres are in too rigid a state; 2. When they are spasmodically contracted; 3. In all active inflammations; and 4. In obstinate costiveness, or accumulations of feces in the intestines.

EMULSION, a form of medicine resembling milk, and which is often prescribed with a view to sheath and neutralize acrid humours, especially in heat of urine and stranguaries, as well as for nervous and irritable habits in general.

Emulsions are frequently made, by boiling the oily and farinaceous seeds contained in kernels; in which case they are soon decomposed, on standing. In short, we cannot even approve of *almond-milk*, as it soon becomes rancid in summer, and is, upon the whole, inferior to emulsions made of gum-arabic, or merely of decoctions of pearl-barley, blanched oats, wheat, rice, &c....If these simple medicines are expected to be productive of any advantage, they ought to be taken in draughts, amounting at least to half a-pint every hour, rather cool than lukewarm, (to save the stomach from relaxation) and to be continued for several days, without eating animal food. In hot weather, or where no objection to acids prevails, a table-spoonful of lemon-juice, or good vinegar, may be added to every draught of the emulsion.

ENAMEL, in general, signifies a vitrefied matter, interspersed

with some solid substance; and possessing all the properties of glass, excepting that of transparency.

The basis of enamels is a pure crystal glass or frit, ground together with a fine calx of lead and tin, prepared for that purpose, with the addition of a small proportion of the white salt of tartar. These form the principal ingredients of all enamels, which are made by adding various pulverized colours, and thoroughly incorporating the whole in a furnace. For white enamel, it is sufficient to add manganese to the matter which constitutes the basis; for azure, saffre mixed with calx of brass; for green, calx of brass with scales of iron, or crocus martis; for black, zaffre with manganese or crocus martis, or manganese with tartar; for red, manganese, or calx of copper with red tartar; for purple, manganese with calx of brass; for yellow, tartar and manganese; lastly, for violet coloured enamel, manganese with brass, that has been three times calcined.

Enamels are used either for the counterfeiting or imitating of precious stones, and for painting; or by enamellers and artists working in gold, silver, and other metals. That species of enamel which jewellers employ, is imported from Holland, or Venice, in small cakes of various sizes, which are in general, about four inches in diameter, and have the mark of the maker indented on them.

[The artist who is desirous to see the latest improvements in this art detailed, is referred to TILLOCH'S *Phil. Magazine*, (vol. xi.) and NICHOLSON'S *Journal*, (8vo. 3 vol.) In the latter, all the processes of the Sevre China manufactory, are detailed by the principal of the establishment.]

ENAMELLING, is the art of laying enamel upon metals, such as gold, silver, copper, &c. whether plain or painted. The latter process is performed on plates of gold or silver, but generally on those of copper, prepared with the white enamel; on which certain objects are delineated with the colours, and afterwards burnt in the fire, where they acquire a brightness and lustre resembling glass.

Painting in enamel is held in greater estimation than any other branch of that art; on account of its peculiar and permanent vivacity, the strength of its colours not being effaced by time, but always retaining their pristine splendour. It is chiefly employed in miniature, as it cannot be easily peformed on a large scale; the enamel being very liable to crack on a plain surface, so that even the smallest plates must be somewhat of a convex form.

ENCYCLOPÆDIA, or CYCLOPAEDIA, signifies the circle, or chain, which connects the different arts and sciences.

In the present work, we have preferably adopted the term "ENCYCLOPAEDIA," for reasons which the philological reader will easily discover. But upon the motives which have induced us to combine this word with the epithet "DOMESTIC," we cannot in this place expatiate; as such an account will appear with more propriety in a future preface.

Many attempts have been made by writers, to reduce the whole circle of the arts and sciences to a systematic order, and exhibit a connected view of them, by representing what has emphatically been

called "*The Tree of Knowledge*;" but we confess our disappointment on such occasions, as we never have met with a satisfactory arrangement. Nor can it be expected that we should succeed in this arduous attempt, so long as there is no accurate and established meaning attached to the very words, which it would be indispensibly necessary to adopt, in order to distinguish the *physical* from the *metaphysical* sciences. The latter, indeed, are, at this *uncritical* period, in a manner exiled from the studies of the inquisitive; tho' they appear to be so closely cemented to the human mind, that they will constantly intrude on our attention, engage the faculties of speculation, and absorb the powers of reflection, even when in a manner proscribed. Conceiving, therefore, that it would be a fruitless innovation to introduce any new terms in the present state of philosophical nomenclature, we shall content ourselves with simply enumerating the heads of the different branches of the arts and sciences.

I. *Divinity*; comprehending Church History, Criticism, and Exegesis; Polemical and Dogmatical Essays; Theological Morality; Sermons and Homilies; Catechetical works; Liturgy and books on Devotion; Translations and Editions of the Bible.

II. *Jurisprudence* or *Law*: which may be divided into English, Scotch, and peculiar private Law; into Ecclesiastical, Political, and Criminal Law; theoretical and practical Jurisprudence; its literary History, &c.

III. *Medicine*; comprising Anatomy; Physiology; Pathology; Symptomatology, or the doctrine of Diagnostics; Therapeutics, Surgery; Midwifery; Pharmacy; the Veterinary Art; Medical Police and Jurisprudence; domestic or popular Medicine, &c.

IV. *Philosophy*: viz. Logic and Metaphysics, or Speculative Philosophy; Psychology, or the practical study of the human mind; Ethics or Moral Philosophy; Theory of Education; Law of Nature; and Political Economy.

V. *Mathematics*; comprizing Arithmetic; Geometry; Astronomy; Architecture; Fortification; and pure Mechanics.

VI. *Natural History*; including Meteorology; Geology; Hydrology; Mineralogy; Botany; and Zoology.

VII. *Universal History*; namely, Geography; Statistics; Diplomatic Transactions; Heraldry; Chronology; Genealogy; Numismatology, or the knowledge of Medals and Coins; Antiquities; Mythology; Archaeology; Biography, and Topography.

VIII. *Belles Lettres*, or Polite Literature....See vol. i.

IX. *Philology*; Grammars, Dictionaries, Editions and Translations of Greek and Roman Classics, as well as of Modern Languages, such as the French, Italian, Spanish, German, &c....Study of the English language, which ought to *precede* all other pursuits; as without a thorough knowledge of the native tongue (of which very few of our *modern scholars* can boast), it is impossible to make great progress in foreign languages, or to become intimate with any complicated art or science.

X. *Economical Sciences*, including all the Mechanical Arts and Manufactures; as well as Trade, Commerce, and Navigation: but principally Agriculture and Gar-

dening; the Arts of rearing Cattle, cultivating Trees, and managing Bees; Hunting; Fishing; Cooking, &c.

XI. *Physics;* namely, Natural Philosophy, Chemistry, Mineralogy, &c.

XII. *Miscellaneous Literature;* for instance, Encyclopædias; scientific works on a variety of subjects; treatises on Freemasonry; Literary Quarrels; Books with obscure titles, critical journals, monthly magazines, and news-papers.

Endive: See Succory.

Engine: See Fire.

ENGRAFTING: See Grafting.

ENRICHING PLANTS, a term employed by gardeners to denote such plants as ameliorate land, in consequence of which the same soil will produce a good crop of corn; as, without attending to the culture of such plants, a very indifferent one would have followed. ....See Crops.

The necessity of sowing such vegetables has, however, been in a great measure superseded by the general adoption of the drill, and horse-hoeing husbandry, by which all weeds are totally eradicated, and consequently they will not obstruct the growth of the corn or other grain that may be sown.... See Drilling.

EPIDEMIC, in general, denotes a spreading disorder which, as is supposed, arises from some corruption or malignity in the air, and attacks great numbers of people at certain seasons.

Mankind have always been more inclined to search for the most distant causes, in order to explain physical events, rather than to avail themselves of those which are within their reach.

[The inhabitants of every country believe that their own is the favoured spot by heaven, which alone is to be exempted from the disgrace of producing epidemic diseases, and uniformly trace them, with *great clearness*, to importation. It is only necessary to read the account of any epidemic, to be convinced of this. But Providence does not interfere with the affairs of men, so as to destroy the rule of philosophising, established by the great Newton, viz. the tendency of the *same causes to produce the same effects*, in similar circumstances. Hence we act unjustly in ascribing diseases to our neighbours, when it is more than probable the "sin lieth at our own door." Much irritation has unhappily been caused by the discussion of the question, whether the fever, which has of late years ravaged the U. States, was imported or of local origin. This is not the place to discuss the point. Those who wish to see it fully and ably canvassed, may consult Rush's *works*, Caldwell's *Med. and Phys. Memoirs*, and the *Med. Rep. of New-York*. Dr. Heberden's late work on the "*Increase and Decrease of Diseases*," and Webster's history of epidemic diseases, ought also to be read with attention, as a greater number of facts are collected on the subject, than ever before appeared in one work, and are elucidated by much perspicuous reasoning.

Dr. Benjamin Mosely, of London, in his late publication, (*Medical Tracts*, 1800,) has also ably treated the subject of pestilential diseases. His observations are highly worthy of consideration, being the result of original thinking, and extensive research.]

The plague, which formerly destroyed great numbers in London,

was not always imported, but probably originated at home, where, in those ages, *cleanliness* was not so generally attended to as it is at present. Hence this domestic virtue has guarded us against many epidemics, to which other less cleanly nations have been subject. But there is still great occasion for improvements, especially in the houses of the narrow courts and allies of the metropolis, where the progress of a contagious malignant fever has lately excited considerable alarm. *The Society for bettering the condition of the poor*, (according to the printed Report of the philanthropic T. BERNARD, Esq.) have proposed another benevolent institution, to check the ravages of contagious distempers among that class of persons, who are most liable and exposed to their influence. Farther particulars relative to this interesting subject we propose to give under the head of INFECTION: See, also, CONTAGION.

EPILEPSY, or FALLING-SICKNESS, though hitherto considered an incurable disease, has often been relieved by the conjoint power of medicines and an appropriate diet. Hence, a pure and fresh air, light but nutritive food; chearful company, and moderate exercise, will be here of greater service than the most celebrated nostrums, which are daily imposed upon the credulous. On the other hand, epileptic patients should carefully avoid all strong and heating, as well as *hot* liquors, which equally relax the stomach; abstain from swine's flesh, very fat meat, [and all articles of food which they find difficult of digestion.]

In a disease of so formidable a nature as the epilepsy, no medicines can be taken with the least probability of success, without having previously ascertained the *cause*, which may be extremely various: for this obvious reason, medical advice cannot be dispensed with unless it be superseded by the pretensions of quack medicines.

Among the numberless means and expedients contrived for the purpose of checking epileptic attacks, we shall only mention two:

Dr. LYSONS, in his "*Practical Essays*," relates the case of a successful application of ligatures to the legs, on the first approach of the fits, which were always observed to commence their course from the lower extremities.

EPSOM SALT, was formerly obtained by boiling down the mineral water found in the vicinity of Epsom. It is at present prepared from sea-water, which after being boiled down, deposits an uncrystalized brine, that consists chiefly of muriated magnesia, and is sold in the shops, under the name of *bitter purging salt*....It is of considerable service in colics, scurvy, rheumatism, and other chronical complaints.

EPSOM WATER is that saline spring, which rises at the distance of about half a mile from the town of Epsom, in the county of Surrey. It is transparent, and colourless, at first almost insipid, but a short time after it has been drunk, it leaves a bitter, saline taste on the tongue. It does not suffer any material alteration by being exposed to the air: and, if closely corked in clean vessels, it may be preserved, for several months in a fresh and potable state.

As this water contains only a small portion of the salt, namely,

from one to two scruples, in the quantity of half a pint, the patient ought to drink from two to three pints successively, within a short space of time, in order to produce the full purgative effect. If taken in this dose, it will operate in a mild and efficacious manner, but if in a smaller, its action is determined to the kidnies.

Epsom water is of considerable service in a variety of disorders, namely, hypochondriasis, an impaired state of health accompanied with œdematous tumours in the extremities, and a depraved digestion; to which sedentary persons are peculiarly liable. Those who are afflicted with hemorrhoidal and scorbutic complaints, will be benefited by the liberal use of this saline water, which likewise affords considerable relief in obstructions of the viscera.

This mineral water is easily imitated, by dissolving half an ounce of Epsom salt in a quart of pure water, rendered somewhat acid, by the infusion of a few drops of spirit of vitriol, and oil of tartar.

Erhines. See Sneezing.

Eruption. See Skin.

ERYNGO, or Sea-holly, *Eryngium*, L. a genus of plants, consisting of eleven species, two of which are natives of this country, viz.

1. The *maritimum*, or Sea-eryngo, which is perennial, grows on the sea-shore, strikes its roots 20 feet deep into the soil, and flowers in the month of July or August.

2. The *Campestre*, or Field-eryngo, which is also perennial, grows chiefly near the sea-side, and likewise flowers in the month of July or August.

Both species possess the same properties; the leaves being somewhat sweet, and having an aromatic warmth or pungency. The sea-eryngo, however, is much stronger than the latter species.... The young, flowering shoots, when boiled, have the flavour of asparagus, and are an wholesome and nutritious summer food. The roots of the first species are principally directed for medical use: they possess no remarkable smell; but, when chewed, have a pleasing, and somewhat aromatic sweetness. Boerhaave considered this plant as one of the principal aperients, and he usually prescribed it as a diuretic and antiscorbutic: at present, however, the roots only are candied, and preserved as sweetmeats: those of the second species are thick, pulpy, sweet and nourishing, on which account the Germans boil and eat them as a culinary vegetable....See Hectic.

In dyeing, these plants afford but an indifferent yellowish brown colour: hence they are, according to M. Meyer, of Prague, more advantageously employed in that city for extracting *soda*, or mineral alkali.

Erysipelas. See Rose.

ESCHALLOT, or Shallot, *Allium Ascalonicum*, L. is a native of Palestine, whence it has been introduced into our kitchen gardens. It is raised from suckers, which are set about the end of February, in beds or furrows, at the distance of about three inches from each other. Towards the end of June, the stems are tied up; and, in the course of another month, the plants are pulled out of the earth; when they are exposed to the air to dry, and afterwards preserved in some dry airy place.

The roots of the eschallot are very

pungent; have a strong but pleasing smell, and are preferred to onions, as ingredients in highly-flavoured soups and gravies. They are also pickled, in which state considerable quantities are consumed in the East Indies.

This plant, when mixed with vinegar, rice, and honey, is said to be serviceable against the bite of a mad dog; we doubt, however, the efficacy and propriety of such an application. It is also recommended as an excellent cephalic, especially when inhaled through the nostrils; but its most beneficial properties are those of creating an appetite, and expelling foul air.

ESPALIERS, in horticulture, are rows of trees, planted in gardens or hedges, in such a manner as to inclose distinct lots of ground; hence they are trained up regularly to a lattice of wood-work, in a close hedge, for defending tender plants against the injuries of the wind and weather.

The trees chiefly planted for espaliers, are apples, pears, and plums. While they are young, it will be sufficient to drive a few stakes into the ground on both sides; the branches being fastened to them in an horizontal direction, as soon as they appear. At the expiration of three years, an espalier is to be made of ash-poles, of which two sizes, large and small ones, should be employed; the former are to be driven upright into the ground, about a foot distant; the latter or smaller poles, are to be nailed across these, at the distance of nine inches.

There is another kind of espaliers, made of square pieces of timber cut to any size; and which are certainly more handsome and regular, but on account of the extravagant price of wood, less economical than those constructed with ash-poles.

As soon as the espalier is thus framed, the branches are to be affixed to it by means of ozier twigs; being trained in an horizontal direction, and at equal distances. Fruit-trees managed in this manner are preferable to all others, because they not only bear more delicious fruit, but also require less room in a garden; and consequently do not retard the growth of such plants as may be cultivated in their vicinity.

ESSENCE, or ESSENTIAL OIL, as it is variously termed, in medicine, denotes the purest, most subtle, and balsamic part of a body, extracted by distillation.

There are a variety of essences drawn from flowers, fruits, &c. which are used on account of their agreeable flavour by apothecaries, perfumers, and others: the principal of these are the essence of rosemary, of turpentine, of anise, of cloves, of cinnamon, and of lemons.

The essences sold by perfumers, chiefly consist of the oil of bitter-almonds, to which they impart the odour of jessamine, roses, cinnamon, and other flowers and spices. When essential oils have been distilled, they should be suffered to subside for some days, in vessels loosely covered with paper, till they have lost their disagreeable, ardent odour, and have become limpid; they should be put into small bottles, which ought to be completely filled, closely stopped, and kept in a cool place: by observing these precautions, they will retain their virtue for several years. But, if essential oils be carelessly managed, they gradually lose their flavour, and become thick: in this

case, they should be put into a still, with fresh ingredients for distilling the same oil; by which means they will saturate themselves with the odoriferous particles, and regain their former strength and purity.

Essential oils, medicinally considered, agree in the general qualities of pungency and heat: with respect to their particular virtues, they vary as much as the vegetables from which they are extracted. Thus, the carminative properties of aromatic seeds, the diuretic effects of juniper-berries, the stomachic virtues of mint, and the antiscorbutic powers of scurvy-grass, are in a great measure concentrated in their oils.

These oils are never given in a pure state, on account of their extreme pungency, which in some is so great, that if a single drop be deposited on the tongue, it will occasion a gangrenous eschar, or scab. They are readily imbibed by pure, dry sugar, being the most convenient form in which they can be administered. The more mild and grateful oils are frequently used as ingredients with other medicines, to render them less nauseous. The more pungent ones are externally employed in paralytic complaints, numbness, colds, aches, and in other cases, where particular parts require to be heated or stimulated.

[ETCHING, Mr. FRED. ACCUM has lately shewn, that the art of etching was known in Germany in the beginning of the last century; but it appears to have been forgotten, or lost. SCHEELE discovered the fluoric acid, and re-invented the art of etching on glass, in 1771.

"A mode of etching, wherein the ground appears in very minute chrystals, first brought into vogue in England, by PAUL SANDBY, and now much used, from its softness, almost equal to Indian ink drawings, is the following:

Dissolve rosin in spirit of wine; pour it on your plate, then pour it off again: as the spirit evaporates, the rosin chrystallizes, leaving a ground to be eaten by aqua-fortis.... For rosin, sandarac or mastic may be substituted.

Or, sift lightly some finely-powdered rosin, through a small lawn sieve, upon the plate. Hold the plate over the hot charcoal, at such a distance as the bottom part of the rosin will just melt sufficiently to adhere to the plate, without one particle running into the other. If melted, the ground will be uniform, which is to be avoided; for interstices are to be left between the particles, whereon the aqua-fortis is to bite." The above were communicated by T. COOPER, Esq. of Northumberland; and may be considered as most important information for American artists.]

ETHER, or dulcified spirit of vitriol, is a very subtle penetrating fluid, prepared by distilling equal proportions of rectified spirit of wine, and vitriolic acid.

This spirit is the lightest, most volatile, and most inflammable yet known; it floats on the surface of the most highly rectified spirit of wine, as oil floats on water: and, if it be dropped on a warm hand, it exhales immediately, diffusing a penetrating fragrance, and leaving no trace of any moisture.

Ether is often successfully employed in medicine. It sometimes affords immediate relief in violent head-achs, by being externally applied to the painful part; and suppresses the tooth-ach, when laid

on the affected jaw. It has also been given internally, with considerable success, in hooping-coughs; in hysterical cases; in asthmas; and, indeed, in almost every spasmodic affection, from a few drops, to the quantity of half an ounce, taken in a glass of cold water, which should be expeditiously swallowed, to prevent the exhalation of this volatile liquor.

There is another preparation of a similar nature, but more powerful in its effects, called *naphtha aceti*, or acetous ether, which is seldom kept in the shops of this country. Its flavour is more pleasant than that of the former, being prepared by mixing six ounces of concentrated vitriolic acid, with 10 ounces of rectified spirit of wine, and pouring this mixture gradually on 16 ounces of regenerated tartar, in a glass retort; and then drawing off about ten ounces, over a very moderate fire. This affords an excellent, but expensive remedy in all the cases where the vitriolic ether is generally used.

[EUPATORIUM, a genus of plants, of which several are natives of the United States. The species most used, is the E. perfoliatum, commonly called thorough-wort. This plant is annual, and rises from 2 to 3 feet high, is hairy, and the leaves at each joint rough, from three to four inches long, and about one inch broad at their base, gradually lessening to a very acute point, of a dark green, and covered with short hairs. This plant certainly possesses active properties, and deserves the attention of American physicians. A strong infusion in water will vomit and purge. A weaker dose will sweat powerfully. A still weaker infusion, drank for some weeks, has done good in cases of deranged circulation, producing scabby and other eruptions, which are commonly said to proceed from "bad blood."]

EUPHORBIUM, a gummy-resinous substance, which exudes from a tree of the same name, growing in Africa; whence it is imported in drops of an irregular form. These are externally of a pale yellowish colour; but, when broken, appear to be white internally. If applied to the tongue, they affect it with a very pungent taste; and, if held for some time in the mouth, they become exceedingly acrimonious, inflaming and exulcerating the jaws to a violent degree. Hence this substance is unfit for internal use, though it is sometimes employed as a sternutatory....See HELLEBORE.

Externally, this gum is the principal ingredient in various resolvent plasters, and has been found serviceable in cleansing foul ulcers, and also in exfoliating carious or rotten bones. At present, it is employed chiefly by farriers, for curing the *farcin*, or the scab in horses. Formerly, the tincture of euphorbium, mixed with the oil of myrrh, was much used for discussing scrophulous tumours, as well as for effacing spots and smoothening inequalities of the skin, proceeding from the small-pox.

[EUPHORBIA, *Ipecacuanha*, Linn. This plant is peculiar to light, dry, sandy soils, and grows abundantly in New-Jersey, and the maritime districts of the southern states. It is a pretty plant, the stems rather procumbent and diffusive in their manner of growth, leaves remarkably variable in their figure, but generally oblong or broad lanceolate, whilst others are long and narrow, some almost li-

niar, like grass; but all are of a full, dark, crimson colour, except such as grow in shade, which are of a livid green, elegantly reticulated with crimson veins. In medicine it is a sure and powerful emetic, but perhaps too drastic, and ought to be administered with caution, and by such as have investigated its properties. It is an Indian medicine, yet commonly used by country people.

We have several other species of this genus, two of which are very handsome plants, viz. E. *Corollata*, E. *Pieta*. WM. BARTRAM.]

EVACUATION, in animal economy, is the act of diminishing, attenuating, or discharging the humours.

The due evacuations of the body, and its proper nourishment, are equally necessary; and it is an object of the utmost importance, that nothing remain in the constitution which should be discharged; and that whatever is conducive to its preservation, may not be uselessly wasted. If the evacuations be disordered, the most rigid adherence to dietetic rules will not contribute to the continuance, or restoration of health; these rules, however, may often be dispensed with, provided the evacuations be regular.

It is not only the noxious, or corrupt matter, which is removed by this process, but also the useful fluids, if they abound, such as the milk, blood, &c. to which subjects we refer, and likewise to the articles EAR, NOSE, URINE, &c.

EVAPORATION, is the conversion of fluids, chiefly of water, into vapour which is specifically lighter than the atmosphere.

There is no subject that has occasioned a greater variety of opinions than the theory of evaporation; but, consistently with our plan, we shall recite only a few established facts.

Evaporation is one of the great chemical processes, by means of which Nature supplies the whole vegetable kingdom with the dew and rain necessary for its support. Hence, it takes place at all times, not only from the surface of the ocean, but also from that of the earth. Nor is it confined to these: it is even carried on from the leaves of trees, grass, &c. with which the earth is covered. Great part of the water which is thus raised, descends again during the night, in the form of dew, being absorbed by those vegetables which yielded it before.

One of the most beneficial effects of evaporation is, to cool the earth, and prevent it from being too much heated by the sun. This property of producing cold, by evaporation, has but lately been observed by chemists, who have accordingly availed themselves of it in its fullest extent; though their mode of procuring cold, by means of those expensive fluids, ether and spirit of wine, can only be employed by way of experiment. The most simple method, however, of producing cold by the evaporation of water, may be applied to various useful purposes, especially in warm countries: thus sailors are accustomed to cool their casks of liquors, by sprinkling them with sea-water....See also ICE.

Dr. DARWIN justly observes, that the evaporation of moisture from the surface of the earth, produces so much cold as to injure those terrestrial plants which are too long covered with it. Hence

such parts of wall-trees as are sheltered from the descending dews, by a coping stone on the wall, are not so liable to be injured by frosty nights; because they are not made colder by the evaporation of the dew, and also have less water to be congealed in their vessels, and to burst them by its consequent expansion.

EVENING, is that part of the night which commences with sunset, and properly terminates when the prudent and industrious repair to their couch....long before midnight.

In countries surrounded by the ocean, the evenings are generally damp and chilly, so that the temperature of the air is many degrees colder than in the preceding day. Hence the necessity of adopting a warmer dress than usually worn, if we are obliged to expose ourselves to the evening-air: invalids and convalescents ought not to leave their apartments after sunset, even though the sky be ever so serene, and the weather uncommonly mild.

Nor is it proper for the healthy to pursue those occupations in the evening, which are attended with proportionally greater fatigue of mind or body: such pursuits ought to be followed in the morning, and the easiest purposely deferred to the latter part of the day; an arrangement by which a more composed and refreshing night's rest will be ensured. Beside this inconvenience, the eyes necessarily suffer from candle-light....See also BED-TIME.

EVERGREENS, in gardening, are those perennial plants which continue their verdure, leaves, &c. throughout the year, such as bays, hollies, pines, firs, cedars of Lebanon, &c.

In the evergreen shrubs and trees of this climate, such as heath, rue, box, laurel, &c. the leaf does not die in the autumn, but continues to supply nourishment to the bud in its bosom during the fine days of winter, and in the spring, and survives till near midsummer, or till the new bud has expanded a leaf of its own. Hence Dr. DARWIN supposes, that these evergreens lay up in summer no store of nutriment in their roots, or alburnum, for the sustenance of their ensuing vernal buds; and thus have probably no bleeding season, like deciduous trees.

Mr. MILNE, in his *Botanical Dictionary*, under the article *Defoliatio*, observes, that " an evergreen tree, grafted on a deciduous one, determines the latter to retain its leaves. This observation is confirmed by repeated experiments, particularly by grafting the laurel (*Laurocerasus*) an evergreen, on the common cherry (*Cerasus*); or the *Ilex*, an ever-green oak, on the common oak." All these, adds Dr. DARWIN, want further experiments, to authenticate the facts so delivered on the authority of ingenious men.

Evergreens are not only very great ornaments to a garden, at all seasons, but they also contribute to the purity of the air, when planted at a proper distance from dwelling-houses. Although their verdure, especially that of the pine and fir-trees, when scattered in rooms, exhales a narcotic and intoxicating effluvium, not unlike that of hops, yet the boughs of all evergreens may be usefully employed, particularly in winter, for

correcting the stagnant air in a room: with this intention, the branches are plunged with their root-ends into vessels filled with fresh water, and exposed to the rays of the sun; but not suffered to remain in the apartment during the night, or in the shade.

EVERLASTING. See CUDWEED.

EWE. See SHEEP.

EXCESS. See DRUNKENNESS.

EXCHANGE, in commerce, implies the receiving or paying of money in one country for a similar sum in another, by means of bills of exchange....See BILL.

The laws of all commercial nations have conferred great privileges on bills of exchange; punctuality in liquidating them, is essential to commerce: as soon, therefore, as a merchant's accepted bill is protested, on account of his insolvency, he is considered a bankrupt.

A regular bill of this description is a mercantile contract, in which four persons are concerned, viz. 1. The drawer, who receives the value. 2. The drawee, his debtor, in a distant place, upon whom the bill is drawn, and who must accept and pay it. 3. The person who gives a valuable consideration for the bill, and to whom, or to whose order it is to be paid: and 4. The person to whom payment is to be made, and who is creditor to the third. By this operation, reciprocal debts, which are due in two distant places, are paid by a kind of transfer, or permutation of debtors and creditors.

Beside those merchants, who circulate among themselves their reciprocal debts and credits, arising from their importation and exportation of goods, there is another class of men who deal in exchange; that is, in the importation and exportation of money and bills. When, however, balances are to be made, exchange becomes intricate; and merchants, being engaged in their particular branches of trade, commonly intrust these complicated calculations to certain agents, who are thence called *exchange brokers*, and have made this a most lucrative employment.

The Course of Exchange, is the current price between two places, which is always fluctuating and unsettled, being sometimes above, and at others below par, according to the circumstances of trade.... When the course of exchange rises above par, the balance of trade is said to run against that country where it rises. But, though the course of exchange be in a perpetual fluctuation, and rise or fall, according to various circumstances, yet the exchanges of London, Hamburgh, Amsterdam, and Venice, regulate those of all the other trading places of Europe....Such readers as are desirous to make themselves acquainted with the laws of this country, as they relate to cash bills, and bills of exchange, will find ample information in Mr. CHITTY'S "*Treatise on Bills of Exchange*," &c. (8vo. 7s.), where the subject is perspicuously and accurately treated.

[The following very useful table of calculations, shewing the value of 100l. sterling, in Pennsylvania currency, according to different rates of exchange, *above* and *below* par, has been published by the brokers of Philadelphia.

Above par.	*Pounds sterling.*	*Pennsylvania currency.*			*Dolls.*	*Cts.*
8 per cent.	108	180	0	0	480	0
$7\frac{1}{2}$	$107\frac{1}{2}$	179	3	4	477	77
7	107	178	6	8	475	55
$6\frac{1}{2}$	$106\frac{1}{2}$	177	10	0	473	33
6	106	176	13	4	471	11
$5\frac{1}{2}$	$105\frac{1}{2}$	175	16	8	468	89
5	105	175	0	0	466	67
$4\frac{1}{2}$	$104\frac{1}{2}$	174	3	4	464	44
4	104	173	6	8	462	22
$3\frac{1}{2}$	$103\frac{1}{2}$	172	10	0	460	0
3	103	171	13	4	457	77
$2\frac{1}{2}$	$102\frac{1}{2}$	170	16	8	455	55
2	102	170	0	0	453	33
$1\frac{1}{2}$	$101\frac{1}{2}$	169	3	4	451	11
1	101	168	6	8	448	89
$\frac{1}{2}$	$100\frac{1}{2}$	167	10	0	446	67
PAR,	100	166	13	4	444	44
Under par.						
$\frac{1}{2}$ per cent.	$99\frac{1}{2}$	165	16	8	442	22
1	99	165	0	0	440	0
$1\frac{1}{2}$	$98\frac{1}{2}$	164	3	4	437	77
2	98	163	6	8	435	55
$2\frac{1}{2}$	$97\frac{1}{2}$	162	10	0	433	33
3	97	161	13	4	431	11
$3\frac{1}{2}$	$96\frac{1}{2}$	160	16	8	428	89
4	96	160	0	0	426	67
$4\frac{1}{2}$	$95\frac{1}{2}$	159	3	4	424	47
5	95	158	6	8	422	22
$5\frac{1}{2}$	$94\frac{1}{2}$	157	10	0	420	0
6	94	156	13	4	417	77
$6\frac{1}{2}$	$93\frac{1}{2}$	155	16	8	415	55
7	93	155	0	0	413	33
$7\frac{1}{2}$	$92\frac{1}{2}$	154	3	4	411	11
8	92	153	6	8	408	89
$8\frac{1}{2}$	$91\frac{1}{2}$	152	10	0	406	67
9	91	151	13	4	404	44
$9\frac{1}{2}$	$90\frac{1}{2}$	150	16	8	402	22
10	90	150	0	0	400	0]

EXCORIATION, or fretting of the skin, is a complaint sometimes arising from want of due attention to infants, or in persons unaccustomed to ride on horseback, or those who are unfortunately bed-ridden.

If the excoriation be only of a superficial kind, the application of a little hot flour, or covering the part affected with fine silken oil-cloth, will generally heal it in a few days: but, if these simple means do not succeed, an ointment consisting of one ounce of the finest mutton suet, and a dozen drops of the common oil of turpentine, gradually added, while the former is melting, has generally been found of service.

In those cases, however, where the true skin is affected, so that the excoriation is attended with considerable pain, it will be useful immediately to apply the plant called self-heal (*prunella vulgaris*), finely pounded in a marble mortar, with the addition of a few grains of alum. Thus, the inflammation of the contagious parts may be prevented; but, if this have already taken place, it should be previously reduced by a timely application of emollient POULTICES, to which we refer.

EXCRESCENCE. See WART.

EXCRETION, in animal economy, is the discharge of foul or noxious humours, by stool.

As the food and drink daily consumed must necessarily deposit feculent and useless matter, moderate evacuations by stool, are both necessary and beneficial, especially to those who are troubled with costiveness, head-achs, flatulency, spasms, and the numberless unpleasant disorders thence arising.... See COSTIVENESS.

Persons in a good state of health ought to have one evacuation at least, and sometimes two, in the course of twenty-four hours....Moderate exercise and a tranquil mind, equally tend to promote these salutary excretions, which should be in a state neither too fluid, nor too concrete. Hard and continued labour, ardent spirits, or heating liquors, as well as long abstinence, render them extrêmely tenacious in the strongest and most healthy individuals. When such a habit prevails, it at length generates costiveness, with all its attendant evils.

Those who indulge either in excessive eating or drinking, are generally troubled with loose and frequent stools; because their alimentary matter is expelled, without being properly assimilated. Indeed, thin and copious discharges are a certain evidence of indigestion.

Regular and daily evacuations, therefore, essentially contribute to the preservation of health. This desirable object may be attained, by taking sufficient, but moderate, exercise; by adapting the food to the nature of the constitution, and using a proportionate quantity of drink; by observing strict temperance in both; and lastly, by not indulging in too much sleep, which is in a peculiar degree hurtful after dinner, to those whose digestive powers are impaired, and whose evacuations are uncommonly languid......By attending to these few practical suggestions, a due excretion of the noxious and superabundant fluids will be promoted, and the greatest of blessings, health, consequently ensured.

EXERCISE, in general, is such an agitation of the body, as pro-

duces salutary effects in the animal economy.

Exercise may be divided into two classes, *active* and *passive*: the former includes walking, hunting, dancing, running, leaping, swimming, riding on horseback, fencing, the military exercise, and, in short, all such games as require particular exertions. Passive exercise comprehends riding in a coach, sailing, swinging, &c. all which we shall notice in their alphabetical order.

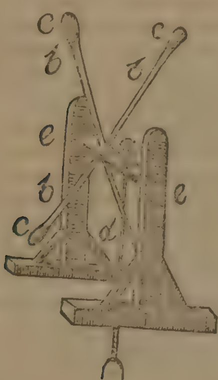
Exercise in the open air is, in every respect, preferable to that in houses, and close apartments. It ought, however, to be commenced and concluded in a gradual manner, and by no means abruptly. It should be continued only while we enjoy it without fatigue, and ought to be relinquished as soon as it becomes a task. The best time for this purpose is the forenoon, or some time before dinner, when the stomach is not too much distended: thus it increases the circulation of the blood; attenuates and divides the fluids; and promotes a regular perspiration, as well as a due secretion of all the humours. It likewise raises the animal spirits, strengthens the muscular parts, creates appetite, and aids digestion. Hence those who take proper daily exercise, are in general robust, and afflicted with few diseases.

On the other hand, violent exercise, or even fast walking, immediately before or after meals, is extremely pernicious; for it impedes digestion, and impels to the surface of the body those fluids which are intended to promote the solution of aliment....Immoderate exercise weakens the body, destroys the elasticity of the fibres, and necessarily accelerates both respiration, and the circulation of the blood; which may cause a variety of accidents, namely, the bursting of small blood-vessels, inflammations, and collections of blood towards certain parts of the body, such as the heart and brain. The saline acrimony of the fluids being thus more disengaged, the fat liquefies; and ardent fevers, palsies, &c. are the melancholy consequences.

Of still greater importance is the exercise of children; for, on its proper regulation, their future health and straitness, in a great measure, depend. This subject having very lately been perspicuously treated by Dr. Struve, we shall subjoin only a few elementary principles from his work on Physical Education: 1. Children ought to enjoy perfect liberty to move, leap, and take exercise at pleasure. 2. They should not be taught to rely on the assistance of others; but endeavour to make every effort consistent with their own strength. 3. When in the act of falling, they ought not to be seized by the arm; and, after a fall, should not be too much pitied. 4. Every kind of *spontaneous* exercise is preferable to that taken by *compulsion*. 5. Exercise, though at an early period of infancy, must be *uniform*, that is, not confined to particular limbs of the body, nor at any time carried to excess..... We sincerely recommended these rules to the serious consideration of those who are engaged in the arduous and important task of rearing children; as we are fully persuaded that, by a timely attention to those circumstances, many accidents, and much deformity, may be effectually prevented.

Many persons, being prevented from walking, riding, &c. in the

open air, either by the inclemency of the weather, or from want of leisure, we have subjoined the following figure, representing a contrivance, that may serve as a substitute for dumb-bells.



The engine consists of a wooden cylinder *a*, which turns on two central pivots, *e*, *e*, inserted in the upright posts.....*b*, *b*, are two rods, that may be made either of iron or of strong wood. These bars intersect each other at right angles, and are furnished with leaden weights at their extremities, *c*, *c*, *c*; which turn the cylinder with great velocity, when the rope *d*, attached to and passing round it, is pulled downwards. Farther, such weights draw the rope up again with considerable force, while it is wound backwards and forwards over the cylinder....As this machinery may be fixed in a garret, or other spare-room at the top of a house, the rope may be conducted through the ceiling into a lower chamber; so that sedentary persons, or invalids, may take sufficient exercise, without quitting their habitation, or exposing themselves to the vicissitudes of the weather.

EXHALATION, generally speaking, denotes effluvia or steams which arise from the surface of the earth, or other bodies, in the form of vapour.

Plants and flowers afford a grateful exhalation, provided their fragrance be not too strong: hence they should never be placed in confined apartments, as instances have occurred of persons being almost suffocated, by sleeping in rooms where quantities of fresh flowers were exposed. In serene weather, however, fresh plants or ever-greens (but by no means flowers) may be strewed with advantage, during the day, in the apartments of valetudinarians; as such vegetables, especially in sunshine, generate a vital air, which produces salutary effects on the lungs.

The exhalations arising from vast numbers of burning candles, as also from the breath of many persons respiring in the same room, are peculiarly unwholesome to weak and consumptive habits. This inconvenience may, however, be remedied by means of conical tubes, the funnels or broad ends of which should be placed so as to communicate in or above the windows, with the open air: thus, the latter will be impelled into the rooms with considerable force, and ventilate them more effectually, and at much less expence than is accomplished by fumigations, or other methods.

The vapour arising from charcoal is particularly hurtful; and, in close apartments, often productive of fatal accidents: the greatest precaution is therefore requisite, when charcoal is employed for culinary or domestic purposes. In a similar manner, *humid air* of every kind is very detrimental to health;

and we seriously reprobate the keeping of damp linen, wet clothes, and even wet umbrellas in dwelling-rooms; as, by paying due attention to this circumstance, many serious accidents might easily be prevented.

EXOTIC, an appellation given to plants, which are not natives of Britain.

The generality of exotic plants do not thrive in this country, without particular care and culture; they require the warmth of their own climates: hence hot-beds, green-houses, &c. become necessary....See GREEN-HOUSE, and STOVE.

The best method of packing exotic plants for a voyage, especially if they be such as will perish above ground, is to set their roots as closely as possible in wooden boxes, filled with proper soil, and provided with handles: this operation may be performed three weeks before they are shipped. During fair weather, they should be exposed upon the deck, but in wet or unfavourable seasons, they ought to be removed, or covered with a tarpawlin.

If exotics are conveyed to a colder climate, they require very little moisture; but, if they are sent from a cold to a warmer country, it will be necessary to water them liberally; and, if they be sheltered from the scorching rays of the sun, they will safely arrive at the place of their destination.

There are, however, several plants that will live for a considerable time without earth, such as the ESCHALLOT (to which we refer), and other *succulent* exotics. These vegetables require only to be carefully packed in boxes, with some moss: a little hay should likewise be added, to prevent the different roots from rubbing against or bruising each other; the boxes should also be perforated with holes, an expedient by which the plants will be preserved from heating, and consequent putrefaction. With these precautions, they will not be materially injured by a voyage of two or three, or even four or five months. Several trees will likewise arrive in safety, if packed up in this manner, *after* they have ceased to grow; such as oranges, olives, capers, and pomegranate-trees, of which great numbers are annually imported from Italy: and, though they are generally three or four months in their passage, yet they seldom receive any damage.

EXPECTORANTS, are such medicines as promote expectoration, that is, the discharge of mucus, or other matters from the breast, lungs, and wind-pipe, by coughing, bringing up phlegm, &c.

Expectorants operate in different ways; for, if the humour secreted, be acrid and thin, and the pores of the glands be too much constricted, these medicines generally relax, soften and widen the passages; diminish the acrimony of the animal fluids; and coagulate those parts which are too thin and watery: for which purpose, the liquorice-root, honey, spermaceti, saffron, mallows, and oil of almonds, are very frequently used. But, if a considerable quantity of thick, viscid matter be lodged in the lungs, so as to obstruct breathing, it will be necessary to aid expectoration by means of such substances as may dissolve the tough and glutinous humours. This object may be affected by taking de-

coctions of the Greater Celandine, Scabious, Elecampane, and other pectoral herbs....See also COUGH, and CATARRH.

Great caution, however, is necessary in administering expectorants of whatever kind. Hence we cannot but censure the injudicious practice of those mothers and nurses, who often load the tender stomachs of infants with a variety of preparations, both of sweet and oily substances, with the view of relieving coughs; but as children have not sufficient strength to promote the evacuation of matter from the vessels of the breast, such potions, far from being of any real service, must necessarily occasion no small injury. Indeed, this practice is the more dangerous, as the cough, and consequent stricture of the chest, may arise from a variety of causes, too numerous to be here recited.

EXTRACTS, are those medicinal preparations obtained by boiling vegetable substances in water, and evaporating the strained decoction in broad, shallow vessels, to a thick consistence. Thus the most active parts of the plants are separated from the useless insoluble earthy matter.

As extraction is a chemical process, generally performed by the apothecary, we shall only observe that the following extracts are directed to be kept in the shops by the London College: viz. extract of broom-tops; of cascarilla; of chamomile; of Peruvian bark, with and without, its resin; of colocynth compounded with aloes, scammony, &c.; of gentian; of liquorice; of black hellebore; of jalap; of logwood; of white poppy; of rue; of savin; of senna; of wild cucumbers, &c.

EXTRAVASATION arises from the bursting or breaking of one or more of the blood vessels, after contusions, fractures, and other injuries of the head, as well as other parts of the body: this accident is attended with such a copious discharge of blood, as frequently occasions the most violent pain, and death itself, unless the patient be timely relieved.

As soon as the seat of the injury is discovered, the extravasated blood should first be discharged; after which the wound is to be cleansed, and all splinters or foreign bodies extracted. The assistance of a surgeon is, on this occasion, immediately required, because a vein must be opened, and as much blood taken away as the patient's strength will permit; by which the extravasation of more blood is prevented. A brisk laxative is next to be given, to lessen the quantity of the fluids; the head is to be fomented with medicated bags; and a plaster of melilot applied to it; while volatile salts, or spirit of hartshorn, may be held to the patient's nostrils; and decoctions of betony, lavender-flowers, or other attenuating liquids are administered, in order to support his strength. These applications will not, probably, be effectual at first; but they should be continued, especially if the more alarming symptoms appear to abate. And if the patient seem to have received benefit from the bleeding, it will be proper to repeat it a second or even a third time, particularly if he be of a robust and plethoric constitution. Meanwhile, no animal food, nor any stimulating liquors should be used, and every degree of mental and bodily irritation should be carefully avoided.

EYE, the organ of sight, by means of which visible objects are represented to the mind.

It would be deviating from our plan, to give a minute anatomical description of this most useful organ; we shall, therefore, confine our attention to the necessary treatment of the eye, in a diseased as well as healthy state; in order to ensure a sound sight, to the latest period of life.

The eye is extremely tender, and liable to a variety of diseases, the most common of which are the following:

1. The eye-lids are sometimes infested with tumours of different kinds, and more particularly the *stye*, which grows on the edge of the eye-lid; is attended with heat, stiffness, pain; and unless proper means be taken, with suppuration.

It is a kind of abscess, which in general, may be removed by discutient applications; but, should these prove ineffectual, a small emollient poultice ought to be applied to induce a suppuration, after which the tumour will spontaneously heal. In case, however, it should not have the desired effect, a surgeon must open the stye with the point of a lancet; when the matter will be discharged.

2. Warts, and other tumors, which require the same treatment as when they arise on other parts of the body. But if in extirpating such excrescences, part of the eye-lid should be corroded, the lips of the sore must be laid as nearly together as possible, and the matter hardening on it, frequently removed, without the application of any dressings: for these, however mild, will only irritate and inflame the ball of the eye.

3. The eye-lashes are, in some cases, so much inverted as to rub upon the eye, and thus produce pain and inflammation. This complaint arises from a variety of causes, without a complete knowledge of which it would be dangerous to attempt any application. Persons afflicted with this, or any other disease in the eye, ought, without loss of time, to avail themselves of professional advice or to consult an experienced oculist, who is able to ascertain the true source from which the disorder proceeds.

4. A protrusion of the eye, if it amount to a considerable degree, is attended with much deformity and uneasiness, arising not only from a large portion of the lining of the eye-lid being turned outwards, but also from too great an exposure of the pupil. If this defect proceed from an enlargement of the eye-ball, or in consequence of a dropsical swelling, the affection of the whole system must be attended to, without applying any local remedies; but, if it originate from the cicatrix of an old wound, or an abscess, it may be relieved by carefully dividing the skin, and taking the utmost precaution to guard against the effects of inflammation: such operations, however, should be performed only by skilful hands. ....Lastly, if it be originally produced by the small-pox, scrophula, &c. or arise from old age, the eyes should be bathed daily with cold water, or with some astringent, and saturnine solution.

5. Specks are sometimes formed upon the white part of the eye, but more frequently upon the *cornea*, or the transparent horny coat, which covers the sight. In the former case, they are seldom attended with much inconvenience; but in the latter, they frequently cause either a partial or total blindness. Such specks are generally consequent to inflammation; and, if vision be materially impaired, it will

be requisite to resort immediately to surgical assistance.

6. A membranous excrescence, called *pterygium*, frequently appears upon the white part of the eye, and often spreads over the cornea, in such a manner as entirely to destroy vision. It is either occasioned by external injuries, or arises from a general disease of the whole system, as in the schrophula, or scurvy, &c; but inflammation is always the immediate cause. In this, as in the preceding complaint, the patient should not tamper with the delicate organ of sight; as, by *one* injudicious application, that sense may be lost, beyond the possibility of recovery.

7. The eye is sometimes enlarged by an accumulation of the aqueous humour; which occasions a sensation of fulness in the eye-ball, gradually impedes the motions of the eye-lids, renders vision progressively more imperfect, till the unfortunate patient can at length only discriminate light from darkness. As the disorder increases, the ball of the eye becomes greatly enlarged, and the cornea begins to protrude; so that if a puncture be not made, the eye will burst, and discharge itself. In the early stages of this disease, the sight may perhaps be preserved by proper treatment; but we earnestly exhort all patients, if they feel the value of their eyes, to avoid those pernicious nostrums, vended under the name of collyria, eye-waters, &c.

8. Inflammation of the eye. See INFLAMMATION.

9. Blindness. See vol. i.

10. Blood-shot eyes. See vol. i.

11. Cataract. See GUTTA SERENA.

12. Short sight, though it cannot be strictly considered as a disorder of the eye, is nevertheless a serious evil. Those who are naturally near-sighted, are seldom relieved from that defect till they attain a certain age, when that uncommon rotundity which occasions it, gradually decreases. In order to remedy this inconvenience, they have recourse to *eye-glasses*, which, on certain occasions, are of real utility; but instead of using both eyes at the same time, or at least alternately, they absurdly close one, while they view an object through the glass with the other; by which means they can only inspect it sideways; a practice that deserves severe censure, inasmuch as the eye which is not exercised, must necessarily become useless.... See SPECTACLES.

These remarks are equally applicable to those persons who can distinguish objects only at a distance; for eye-glasses to them also become necessary, to enable them to behold more minute objects with greater precision.

Weak eyes are chiefly occasioned by residing in confined situations; hence so many persons, living in towns, complain of this misfortune, which can only be attributed to the want of a pure atmosphere, as well as to the confined circle of vision :....the rays of light being reflected from smooth walls which dazzle the eyes, cannot fail to injure those organs in a very material degree.

Those parents, consequently, who have a just regard for the health of their children, cannot testify it more effectually, than by exposing them daily and frequently to the bracing influence of the fresh air; and, if it become necessary, to confine them in nurseries, instead of selecting the smallest and lowest

apartment, the loftiest and most airy should be appropriated to that purpose. For a similar reason, infants ought to spend a considerable part of their time near the windows, where distant objects may attract their attention; a practice which is highly conducive to the improvement of sight.

Those adults who are afflicted with weak eyes, should always burn two candles, placed in such a direction that their flame be neither too high nor too low; or rather make use of proper lamps: See vol. i. and also, the article LAMPS. Persons of this description should never approach strong fires, nor live in hot rooms; for heat dissipates the natural moisture still remaining in debilitated eyes, so that it materially tends to weaken that organ, and at length induces total blindness. Rest, after long exertions, is very necessary and useful to the eyes, but the lids should never be too closely shut, as a continuance of that practice is very pernicious. Similar effects arise from a rude and frequent friction of these tender parts.

Few remedies for preserving the eyes are more refreshing and invigorating, than cautiously bathing them in cold water, three or four times in the day; the eye not being abruptly immersed, and the washing expeditiously managed. The drying of the eyes should likewise be carefully performed, lest that organ be too much stimulated, and at length inflamed.

[In common inflammations of the eyes, a very cheap and efficacious remedy is a solution of ten grains of *sugar of lead*, in half a pint of rain, river, or snow water. Scarifying the whites of the eyes with the point of a sharp lancet, (a simple operation), affords immediate relief. Leeches are also highly useful in this complaint. Eyes naturally weak may be strengthened, by frequently washing them with weak brandy and water, and by wearing a white hat, with black underneath, in summer. In chronic sore eyes, the following ointment has been used with great success:....Fresh butter three oz. red precipitate of mercury one drachm, (60 grains): a small quantity is to be put in at the corner of the eye, when retiring to bed, and washed out the next morning with cold water. Dr. CUTBUSH, of the American navy, informed the Editor, that he learned, while in the Mediterranean, that the Egyptian sore eyes, which proved so troublesome to the troops lately employed by France and England in that country, were speedily cured, by the application of a blister to the forehead.]

EYES OF HORSES....These are liable to a variety of diseases, which proceed either from a defluxion or rheum, or from some internal injury.

If a defluxion be the cause of the malady, it will previously be necessary to ascertain, whether it arises from the eye itself, or from some other injured part, as, in the latter case, the healing of that part will generally cure the eye. In the former, it will be requisite to administer remedies which cool the animal's blood; with this intention, two ounces of Glauber's salts, and two drams of nitre, may be mixed, and given every day with his bran; but if he should loathe his food, an equal quantity of the liver of antimony may be substituted, till his appetite returns.

When the eye has received ex-

ternal injury, the following application is recommended: Take of hog's lard; the oil of roses; and of elder, equal parts; and as soon as those ingredients are incorporated over the fire, anoint the eye affected, which will soon recover its former energy....Some horses have naturally *weeping* eyes, which emit a sharp, acrid humour. These, however, may be easily cured, by washing or bathing them every day with brandy.

[Inflammation in the eyes of horses, must be treated by general as well as local bleeding, purging, short allowance, and darkness; the eyes may be washed with weak lead-water, three times a day.

Haws, or warty excrescences in the eyes of horses, may be removed by the following operation:.... Pass a thread, armed with a needle, through the upper eye-lid, and top of the ear, and draw them together, until the eye opens sufficiently: then pass another thread through the upper edge of the washer of the eye, until the haw is exposed, and can be fairly laid hold of; it must then be carefully dissected out with a scalpel. This was the mode practised by a farrier from Europe, in the American army, during the revolutionary war.]

EYE-BRIGHT, or *Euphrasia officinalis*, L. an annual indigenous plant, growing on heaths, dry, barren meadows, and in pastures; it flowers from July to September.

This vegetable is remarkable for not thriving in any situation, unless it be surrounded by plants that are taller than itself. It is eaten by cows, goats, horses, and sheep, but is refused by hogs.

Eye-bright is somewhat astringent and bitter; it imparts a black colour to a solution of vitriolated iron. Its reputed efficacy in curing various disorders of the eyes, appears to us doubtful: several authors, however, strongly praise its virtues, and maintain that it is particularly useful to eyes impaired by long-continued application, and also to those which are dim and watery, in consequence of old age. For this purpose, Mr. BRADLEY advises the powder of the dried leaves to be frequently taken internally, after mixing it with the yolk of an egg, and likewise to make daily use of this herb among culinary vegetables, or to apply a decoction of it in simple water externally.....In common with many other plants, the eye-bright has also been recommended in the jaundice. We confess our inexperience of its salutary effects.

F.

FACE, generally signifies the visage of any animal: it is more particularly applied to the human countenance; being the only conspicuous part of the body.

The human face is called the image of the soul, because it is the seat of the principal organs of sense, and the place where the ideas and emotions of the mind are most obviously displayed. It has always been considered the most comely and expressive part of the frame, so that various lotions, powders, &c. have been invented for beautifying and restoring ugly or decayed countenances. Such practice, however, though sanctioned by the folly and caprice of fashion, cannot be too severely censured. Having already pointed out this absurdity, and mentioned such preparations as *may* be safely used by those who are determined to employ them, we refer the reader to the head COSMETICS.

FACE-ACH, or *Tic douloureux*, is an acute pain in the face, which is sometimes accompanied by suppurating tumors: it mostly attacks persons of delicate habits, and those who are uncommonly susceptible of cold.

To remove this distressing affection, the use of volatile salts, and other cephalics, is generally insufficient. Hence the tincture of valerian, with vitriolic æther, may with more advantage be resorted to, both externally and internally. Relief has, in some instances, been derived from the compound tinctures of castor and of asafœtida; but, if these various remedies prove ineffectual, the feet should be bathed in warm water, a fœtid clyster be administered, and recourse had to electricity. A draught of vinegar or warm water, has occasionally procured ease; but, in very violent cases, opium only, under proper medical guidance, is capable of suppressing the pain. Lastly, a new and efficacious cure for the face-ach, has been discovered by Dr. HAIGHTON:....He directs the nerve proceeding from the infra-orbital hole, to be divided; but this operation ought to be performed by a skilful surgeon; as, otherwise, irreparable injury might be committed on the eye....[See *Med. Records and Researches.*]

With a view to prevent a return of this malady, the patient should undergo a course of *tonic* medicines, namely: Take a copious draught of spring-water, early in the morning; repair to the tepid, or, if his strength admit, to the shower-bath; and use the Peruvian bark.

FAGGOT, a bundle of pieces of wood, tied together for fuel, or other purposes.

In making up faggots, the workmen trim or cut off the superfluous branches, from the sides and end, which they insert in the middle of the bundle, where they can be of little service. Instead of continuing this wasteful method, such superfluous leaves and boughs ought to be scattered on the ground, which will, in consequence, be considerably ameliorated; for this kind of manure is particularly beneficial to bad and exhausted land,

which may thus be converted into an excellent garden mould; and the growth of young trees will be remarkably promoted.

FAINTING....See SWOONING.

FAIR, a public place, where merchants, traders, and other persons, from remote parts, assemble on some fixed day in the year, to buy and sell commodities, and to partake of the diversions usually to be met with on such occasions.... See MARKET.

Fairs are of a very ancient origin, and, though in former times, when the commercial intercourse of distant towns and countries was more difficult than it is at present, such establishments were useful, and perhaps necessary; yet, we are of opinion, that their *gradual* abolition would be attended with real benefit to the community....Many scenes of idleness and profligacy might thus be obviated, and an additional number of valuable house and shop-keepers might be maintained in country towns and villages, in order to furnish the necessary commodities....instead of those unsettled dealers who spend one half of their time in travelling from fair to fair, and thus consume the profits of their trades, without materially contributing to support the burthens of society.

FALCON, a formidable bird of prey, of which there are two species, namely:

1. The JER-FALCON, *Falco Gyrfalco*, L. which is but seldom found in Scotland and the Orkneys: next to the eagle, it is the most intrepid and voracious of the feathered tribe, and likewise the most valuable species for the purposes of falconry. The stork, the heron, and the crane, fall easy victims to its bold attacks; and it kills hares, by darting upon them in a direct line....It is remarkable that in this, as in all other birds of prey, the females are much larger and stronger than the males, which last are employed in falconry to catch only the smaller birds, such as the crow, the heron, and the kite.

2. The GENTIL-FALCON, which is less ferocious, and also rarely met with in Britain.

FALL, or the act of tumbling from an erect posture, or, from a higher place, is sometimes attended with serious consequences; especially if it should be neglected in the beginning. Hence the necessity of examining the whole body, whether the fall has been productive of violent bruises, dislocations, or fractures; in which cases surgical aid should be immediately procured. But, if the person fallen, remain motionless, and in a swooning state; or in order to prevent him from fainting, it may be useful to administer a wine-glass full of sweet oil of olives, which will greatly tend to calm and compose the whole body.

After a fall from a precipice, or high place, it will perhaps be necessary to open a vein; but we cannot approve of that superstitious remedy, on this occasion, advised by the late Prof. BRADLEY; according to whom, the blood issuing from the comb of a large cock, and gradually drunk, after every clipping with a pair of scissars, gives so much vigour and strength to the wounded, as to enable him to be dressed.

FALLING-SICKNESS. See EPILEPSY.

FALLOWING, in agriculture,

is the mode of preparing land, by ploughing it a considerable time before it is ploughed for seed.

Lands are laid fallow either during the summer, or during the winter, according to the nature of the soil, and the judgment of the cultivator. It is not our intention to enter into the dispute relative to the necessity or inutility of summer fallows; as very able arguments have been alledged as well for, as against it, by skilful agriculturists. Both summer and winter fallows, however, are occasionally useful on different soils.

The advantages to be derived from fallowing are: 1. By repeatedly turning soils over, much carbonic acid, or fixed air, is produced in a fluid state, which remains united with the vegetable recrements, or with volatile alkali, or calcareous earth. 2. The parts of the soil become better incorporated, and thus reciprocally ameliorated; so that they may afford more uniform nourishment to the roots of plants. 3. The pulverized soil is more easily penetrable, and thus exposes a greater surface of its cavities to the vegetable absorbents. 4. All unprofitable plants, or weeds, being thus eradicated, or continually ploughed under the soil, while yet young, a considerable proportion of vegetable nutriment will be reserved, and farther increased, by the saccharine and mucilaginous matter of the young vegetables buried by the plough. Lastly, some plants, during their herbaceous state, do not exhaust the ground on which they grow, before the seed-stems arise; as turnips, for instance, when pulled up, and carried away for the purpose of feeding cattle, or sheep, on other grounds. This benefit appears to arise from the soil being shaded by the thick foliage of those vegetables, and consequently ameliorated; for its nutritious properties cannot have suffered by evaporation so much, as if the land had been exposed to the scorching influence of the sun.

Dr. Darwin, when treating on this subject, justly observes, that, though a summer fallow may be of advantage to a poor soil, which has nothing to lose, yet it must be injurious to a rich one, which has nothing to gain.

A *Fallow-cleansing Machine* was invented by a Mr. Aaron Ogden, a smith, at Ashton-under-Line, near Manchester. It consists of two large rollers, armed with iron spikes, to which the inventor prefixed an harrow so constructed, that it may be set to go to any depth in a furrow, without *weighting*; and will pulverize the soil, raise the roots, or weeds, to the surface, and at the same time not be obstructed by their accumulation, though it should raise as many weeds as would load a cart within the short space of five yards. There are several other pieces of machinery belonging to this implement; but as they are intricate, we refer the reader to the third vol. of the work, entitled, "*Museum Rusticum et Commerciale*," where its parts are minutely described, and illustrated with a plate....The design of this machine is to clear fallowed land from quick and all other weeds, in a better and more expeditious manner than is effected by manual labour; and Mr. Ogden is of opinion, that two men, with three horses and his implement, may perform as much work as forty men in the ordinary way, beside saving one fallowing season; an object of the

utmost importance to the speculative farmer.

Family Diet. See Diet.

Family-Mill. See Mill.

FAN, a well known contrivance employed chiefly by females to raise wind; cool the air by agitating it, and defending their complexion.

This kind of toy was introduced into Britain from the East, where it is very generally used for shading the face from the sun, and guarding it against troublesome insects. Although the practice of fanning be sanctioned by fashion, it does not appear to be conducive to health, nor consistent with the operations of nature; because the evaporation of perspirable matter on the human skin has a greater tendency to cool the body, than the incessant fanning, wiping, and rubbing of the face. Nevertheless, fans may be useful for affording protection against the rays of the sun, for which purpose, however, *parasols* will be more convenient.

Fan is also an implement of husbandry, employed for winnowing corn....See Winnow.

FARCY, a disorder peculiar to horses, but which sometimes also affects oxen, and other cattle.

The farcy is infectious, and spreads among horses, in a manner similar to the distemper.

This malady is generally occasioned by sudden changes of excessive heat and cold; it may also take place when the animal is galled by rusty spurs, snuffle-bits, &c. or after being bitten by an infected horse.

[The farcy is a disease of the lymphatic system. It is commonly, but erroneously supposed to be a disease of the blood vessels. The corded tumors which appear, are called *buds*, and generally are on the inside of the thigh, neck, and shoulders.... They are very painful at first, but nearly insensible after they have suppurated. On opening them, an ulcer, very difficult to heal, is formed.

The causes are principally putrid matter, coming in contact with the skin, changes from heat to cold, or the contrary, want of exercise, and of cleanliness. To cure the disease, blood must be taken away, smart purges of aloes and calomel, mixed with honey or molasses given, and 1 oz. of mercureal ointment, joined with camphor, rubbed every day below the tumors, until a salivation is produced. Applications of sal-ammoniac dissolved in water, (one oz. to a pint of water) will also be highly useful. By the above treatment, the editor had the satisfaction to cure a very fine horse, belonging to a friend, last year, which had been given up as lost.

If the tumors cannot be dispersed, they may be opened with a lancet, after being fully maturated, and then dressed with bees-wax and oil. Proud flesh must be kept down, by red precipitate; and powdered antimony, freely given. If the horse become emaciated, the diet should be generous; but if in high flesh, the allowance should be short.

The common practice of firing these tumors, is highly cruel and absurd. There can be no reason, why lymphatic swellings should be treated differently, when they occur in horses and in human creatures, in the latter case, firing would not be thought of.]

Farina. See Flour and Pollen.

FARM, a small district of land,

on which is erected a house, with other conveniences; hired or taken on lease, or otherwise, for the purpose of cultivation.

Having already, in the course of this work, discussed various subjects of rural economy, we shall at present confine ourselves to *experimental farms*, as the articles necessarily connected with farming, appear in their alphabetical order.

The national importance of agriculture appears to be universally admitted: and though much has been said by others on this subject, we cannot but consider the engrossing, or concentrating of several farms into one, as a principal cause of the poverty discernible among the lower class of husbandmen, and the late exorbitant price of provisions. Population thus necessarily becomes checked; for many industrious persons who, while in a state of servitude, would be storing up their little earnings against a future period, are deterred from settling, by the dismal prospect of being unable either to support themselves as day-labourers, or to take a farm consisting of several hundred acres. Hence such individuals as are better provided with pecuniary means, enjoy what would otherwise maintain, perhaps, *ten* small farmers and their families, together with such assistants as it would be requisite for them to employ.

In reflecting on this topic, it is matter of just astonishment, that no experimental farm, though frequently proposed, has been hitherto undertaken, in a country where agriculture is peculiarly valued; as, in the western hemisphere, where the arts and sciences are still in their infancy, various institutions of this nature have lately been established. The following plan of a *grain-farm*, is extracted from the observations of Mr. BORDLEY, an intelligent American, whom we have repeatedly mentioned.

Acres.		Acres.	
20	Pulse and roots, fallow crop.	$17\frac{1}{7}$	Maize, fallow crop.
		$17\frac{1}{7}$	Ditto, for which may occasionally be substituted buck-wheat.
20	Barley.	$17\frac{1}{7}$	Barley or rye.
20	Clover.	$17\frac{1}{7}$	Clover.
20	Wheat.	$17\frac{1}{7}$	Wheat, which may be sown with buck-wheat and clover, if the soil be rich.
20	Clover.	$17\frac{1}{7}$	Clover.
20	Rye.	$17\frac{1}{7}$	Roots.
120	acres in six fields.	120	acres in seven fields.

The first course requires one of the fields to be continued in clover for two years, unless it be cultivated with buck-wheat, potatoes, or other roots; when the first year's clover is turned in, after the spring mowing. The potatoes (in America) should be planted in June; for in that late season the roots, while *bulbing*, will receive little injury from the scorching heat of midsummer. Mr. BORDLEY recom-

mends them in preference to buck-wheat, as this, by running to seed, is apt to impoverish the soil: on the contrary, potatoes, turnips, and other roots, do not materially exhaust the soil; and, if properly cultivated, are, in his opinion, even meliorating.

If, according to this plan, one field be manured in each year, the six fields, consisting of 20 acres each, will be all manured in rotation; and those containing 17 acres each, in seven years: an object of the utmost importance, as, independently of the abundant crops raised in consequence of this operation, the soil will thus renew its fertilizing properties.....The net produce of the different sorts of grain and pulse, as well as their respective quality and specific gravity, ought, in each experiment, to be minutely recorded. Mr. B. proposes to continue the annual manuring of each field in rotation; and particularly recommends the saving of the dung in compact masses, sheltered from the sun; and also, in some measure, from the rain: though he allows, that the manure is not materially injured by the dropping of the rain on the area of the dung-heap, as some portion of moisture is absolutely necessary for promoting its fermentation. He farther advises the making of experiments on detached parts of the soil with lime, gypsum, clay, &c. in order to ascertain with precision their effects on different soils.

In the 4th volume of *Annals of Agriculture* (1785), Mr. Arthur Young bitterly and justly complains of the unpardonable neglect and indifference shewn to the interests of agriculture, by the sovereigns and courtiers of all ages and countries. Since that period, however, an exception prevails in Britain; a Board of Agriculture has been established; and though we cannot boast of many evident advantages which have resulted from that excellent institution, yet there is every prospect that a national or experimental farm will, at length, be adopted, in order "to hold out as an example to the nation, the most vigorous system of modern substantial improvements in husbandry." As the late President, Lord Somerville, has proposed such an establishment to take place only after the expiration of four or five years, we devoutly hope the first President of that Board, Sir John Sinclair, will be enabled to carry this desirable measure into effect, by private subscription, at a much earlier period.

With respect to the expences and profits of farming, we cannot enter into any detail, as such particulars necessarily depend on peculiar circumstances. The common allowance on a farm, was, in Mr. Tull's time, *three* rents or assessments; one for the landlord, a second for the expences, and the third for the tenant's subsistence, and for other purposes. There are, however, few farms, even in the present improved state of agriculture, that will constantly afford this increase, or which can be carried on, and maintained at such a charge. For instance, in a farm worth 100l. per annum, if the land be worth 20*s*. per acre, 100*l*. will perhaps be sufficient to defray the expences necessarily incurred..... But, if the soil of a farm, which is let at the same total amount of rent, be worth only 10*s*. per acre, an allowance must be made of 120*l*. or 130*l*. per annum, at the

least for charges; and 250 acres of land must be computed to be the extent of the farm, in order to make up the rent, otherwise considerable loss will necessarily be incurred, unless the land be capable of great improvements. It should, however, be remarked, that these proportions subsisted in England about 80 years since, but are now greatly altered; for instance, an acre of land then rented at 20*s.* per annum, pays at present from 2*l.* to 3*l.*; and the price of manual labour is raised nearly in a similar proportion.

According to the modern improved state of agriculture, the expence of cultivating a farm of 1000 acres, consisting partly of pasture, arable, meadow, and other land, (the annual rent of which is, by Mr. MACRO, of Barrow, Suffolk, stated to be 415*l.*) amounted in the year 1786, to 2208*l.* 2*s.* and 6*d.*.... In order to balance this expenditure, the profits of a farm should be about *five* times the annual rent: and if the combinations of engrossers be suffered to proceed with impunity, they will, no doubt, in a short time, amount to *six* or *seven* times the value of the rent actually paid.

FARM-HOUSE, in rural economy, is applied particularly to the dwelling occupied by a farmer.

The principal objects to be attended to in erecting farm-houses are, convenience, and a salubrious situation; points highly important to every inhabitant of the country, as the health and welfare of all, in a great measure, depend on the choice of the latter.

Beside the general salubrity of the spot where dwellings are to be erected, the *air*, *water*, and *soil*, also require to be particularly attended to; the first should be pure and temperate; the second, wholesome, and easily obtained; and the soil, rich.

The most healthy place of the farm ought to be selected for building the house, which should be exposed neither to the summer heats, nor to the rage of winds and storms during winter. Many parts of this country abound with rivulets and streams, which, however, are seldom attended to, though a judicious choice, in this respect, is of the utmost consequence. A quick flowing stream, that has a clean channel and dry banks, will considerably add to the beauty and healthiness of the place; but, if the water be over-run with weeds, or other strong grass, such a situation should be carefully avoided; for, as it affords a secure shelter to every kind of putrid filth, noxious vapours will arise, and produce effects very injurious to health. If, nevertheless, such places must unavoidably be chosen, a northern aspect is preferable to a southerly one; for, as the north winds blow more briskly than those from the south, the air is in general cool, putrefaction is checked, and there will not only rise fewer vapours, but in consequence of the greater density of the air, they will be speedily dissipated.

Respecting the construction of farm-houses, we have little to add ....Instead, however, of thatching them, it would be highly desirable that they should be uniformly covered with slate, or tiles, in all situations where these materials can be procured. But, where neither slate nor tiles can be had, we recommend the covering, both of farm and out-houses, with heath or ling; either, when well laid on, is

preferable to straw; and at the same time so cheap, that in any country adjoining to heath-moors, it may be procured for the mere labour of cutting and carrying it to the premises.

Having already, in former parts of this work, communicated a variety of practical directions, relative to the construction of houses, in general, we refer the reader to the articles BUILDING, CEMENT, and COUNTRY-HOUSE.

[FARM-YARD. To give the plan of a complete farm-yard, is not to be expected. Farmers differ so much in their situations, pursuits, resources as to capital, and in their opinions of the necessary arrangements, that it is next to impossible to lay down the plan of one that would be deemed perfect. All that can be done in a work like the present, is to give the general outlines, with proper references to works in which various plans may be seen.

"The whole yard and its buildings should be in view from the mansion, and at a proper distance therefrom. The food near the housed live-stock. The yard compact, and the doors of the buildings, and the gates of the yard seen from the mansion. The yard containing cattle to be housed, is never to be littered with straw, but all litter carelessly dropped on it, is to be raked off, for security against fire. When the beasts are let out to be watered, they are instantly to be returned to their stalls, regularly in detachments.

The home-stead includes this yard; together with its stack-yard, the garden, orchard, and a few acres, for occasionally letting mares, or sick beasts run in, at liberty.

The mansion ought to be airy on every side. Offices on the north-east and north-west angles, leave the mansion open to the south, the east, and the west, in a clean lawn; and from the north rooms, there should be a view of the farm-yard, and its business.

No stairs ought to proceed from the kitchen, as they would open a passage to dust and down from the bed-rooms. An arch of brick is to be laid over the ash-hole and oven, as a barrier against fire; the stairs may be over the arch, from without. The poultry-house and yard to be roomy, and frequently swept out: fresh sand and gravel to be strewed in the yard. [To fatten them, see article POULTRY.] The Laboratory will be treated of and figured, under that article.

The milk-house may be joined to the laboratory, which may be a scalding house to it; or it may be detached from the laboratory, and sunk two feet under ground. The offal-milk may be conveyed to the pigs in wheel-barrows, or through a [grated] tube, under ground, to the pig-stye....Water from the pump to be admitted through pipes to an upper shelf, and passing round the room, may fall on the under shelves, and run off.

The ice-house will be best detached from the milk-house, that it may be clear of all moisture, and receive air on all sides. The ice-house at Gloucester point, below Philadelphia, strongly recommends that it be half above ground.

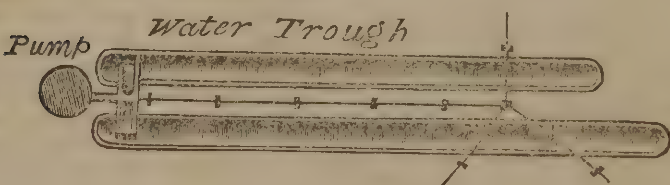
PIGEON-HOUSE. Pigeons feed expensively on corn alone, but they also feed on many wild seeds. They make an agreeable variety on the table, [and form an important article in that œconomical dish, a pye. See article DIET.] They

ought not to be suffered to become too numerous. [See article PIGEON-HOUSE.]

The FAMILY-YARD, is a barrier against farm-yard intrusions. It is covered with a clean, close sward. Its margin only may be admitted to grow flowers. To be fenced by a sunk fence, on the top whereof may be a low light palisade; which with the bank may be hid by rose trees, planted in the ditch, which may slope gently up towards the mansion. The white rose-bush or tree is the tallest, most hardy, and handsomest sort; but the damask is best for yielding the fine distilled water.

The pump may serve both family and farm-yard purposes, and may be worked by a brake or handle on either side of the palisade. This large expence of water is advantageous to its quality. The pump nozzle delivers the water five or six feet above the surface : and and at every time of being worked, a portion of the water is delivered into a vessel, whence proceeds a tube three feet under ground, to the kitchen, where some of it is deposited in a cistern ; the rest may proceed also under ground, to the milk-house, only leaving on the way a small part, in a receptacle of the mansion, for wash bason uses. For the boiling house, which takes much water, either the water must be conveyed through the pipes, or in casks on barrows, or a pump must be placed near the boiling house."

The arrangement for the distribution of the water in Mr. J. COOPER's yard, is excellent, for by the disposition of his spout and fences, he waters four kinds of beasts at the same time, Thus,



" *The Sow and Pig sties.* The offal milk may be conveyed to the troughs in the styes, from the milk-house. Sticks in a frame may be fixed over the troughs, rack like, to prevent the hogs from getting into the troughs. Swine must be kept clean, and littered in their shelters. [If the house be situated near a creek, the stye may be fenced on each side down to the edge of the creek, and thus the animals afforded an opportunity of washing themselves in clean water, at will. Such a stye the editor saw on State Island, south of Philadelphia.]

Stercories may be four feet under ground, two or three feet above, and walled. Over them may be supported by short standards, a covering of brush wood or straw. One of these should be near the stable, to receive the urine from the

animals, which is of immense benefit to the manure."

[The bottom and sides of the stercories ought to be covered with Mr. HUNN's cement, formerly mentioned, to prevent the loss of urine by soaking into the ground.]

"The sheep-house and yards ought to be roomy and airy, in divisions.

The granary should be long and narrow, with partitions across it, without any communication between the rooms; by which the different grains will be kept from mixing, and a general access to the rooms will not happen, when only one sort is to be carried in or taken out. Each outer door should have a lock. Windows facilitate thefts. None are required to the lower rooms, if an air hole be made between every two joists, close under the second floor, the vapour and heat, naturally ascending, will pass off at the air holes."....*Mr. Bordley.*

For other plans of farm-yards, the *Annals of Agriculture*, by A. YOUNG: the county reports drawn up for the *British Board of Agriculture*; and the works of Mr. MARSHALL, may be consulted.

The BARN is a most important building in a farm-yard. Under this article, some account of the English barns was given by Dr. WILLICH; what is now to be said will refer exclusively to those of Pennsylvania.

The barns in Pennsylvania are certainly superior to any in the world. This assertion is made with reference to those which are represented in books of agriculture. Our barns are in general, models of neatness, durability, and convenience. In Lancaster county especially, they form one of the most prominent and attracting objects, which arrest the attention, and force an expression of admiration from the passing stranger.

When a hill can be had, it is cut down seven or eight feet perpendicularly, and one end built close up to the bank. The ground story for cattle is, therefore, seven or eight feet high, the next may be thirteen feet. If the bank be not so high as the second floor, it must be raised up to it. But this is so expensive that, if possible, it ought to be avoided. Under the bank is a vault, proof against frost, and opening into the stable. The joists of the threshing floor, are very effectually and conveniently supported by pillars or stauncheons, so disposed, as to serve for dividing the stalls for the cattle, and, thereby, answer a double purpose. The roof is invariably supported by posts and braces resting on the interties which lay at right angles with the purlins, and divide the threshing floor from the mows. The braces and posts receive the purlins, and discharge the weights of the roof, and as they may be multiplied at pleasure, the roof may consequently be extended to almost any span, without increasing the size of the timbers.

The second floor with the roof contains the sheaves of grain, to be here threshed. On the other side, part of the hay is stored. Loaded carts and waggons are driven in on this second floor: and in some large buildings, a waggon may easily turn, but if the waggon be driven directly into the barn, it may be as directly backed out again: and thus much room and expence saved. Besides, if the lively, briskly

going one horse carts, be preferred (as they ought) to the tedious heavy loaded waggons, there will be no necessity for much width of floor.

Air is commonly admitted either by loop holes or windows, but lattices moving on a centre at each end, with louffers (which see) are certainly preferable; because they will keep out the driving snow, which frequently finds entrance into the barn, and occasions much trouble. By means of louffers, also, light may be excluded or admitted in an instant, and rain or snow effectually prevented from entering.

The first barn built in the northern townships of Philadelphia county, upon the very excellent German plan, was by Edward Duffield, Esq. in the year 1789, and since that period his model has been copied by many in the neighbourhood.

The following particulars respecting it, deserve notice from all œconomical farmers.

There are no door frames, except to the main door opening on the threshing floor. They are hung upon hooks and eyes, but in a different manner from the common mode, the hooks being welded to the hinge, and inserted into the eye, which is let in between two stones in the jamb of the door-way, Thus,

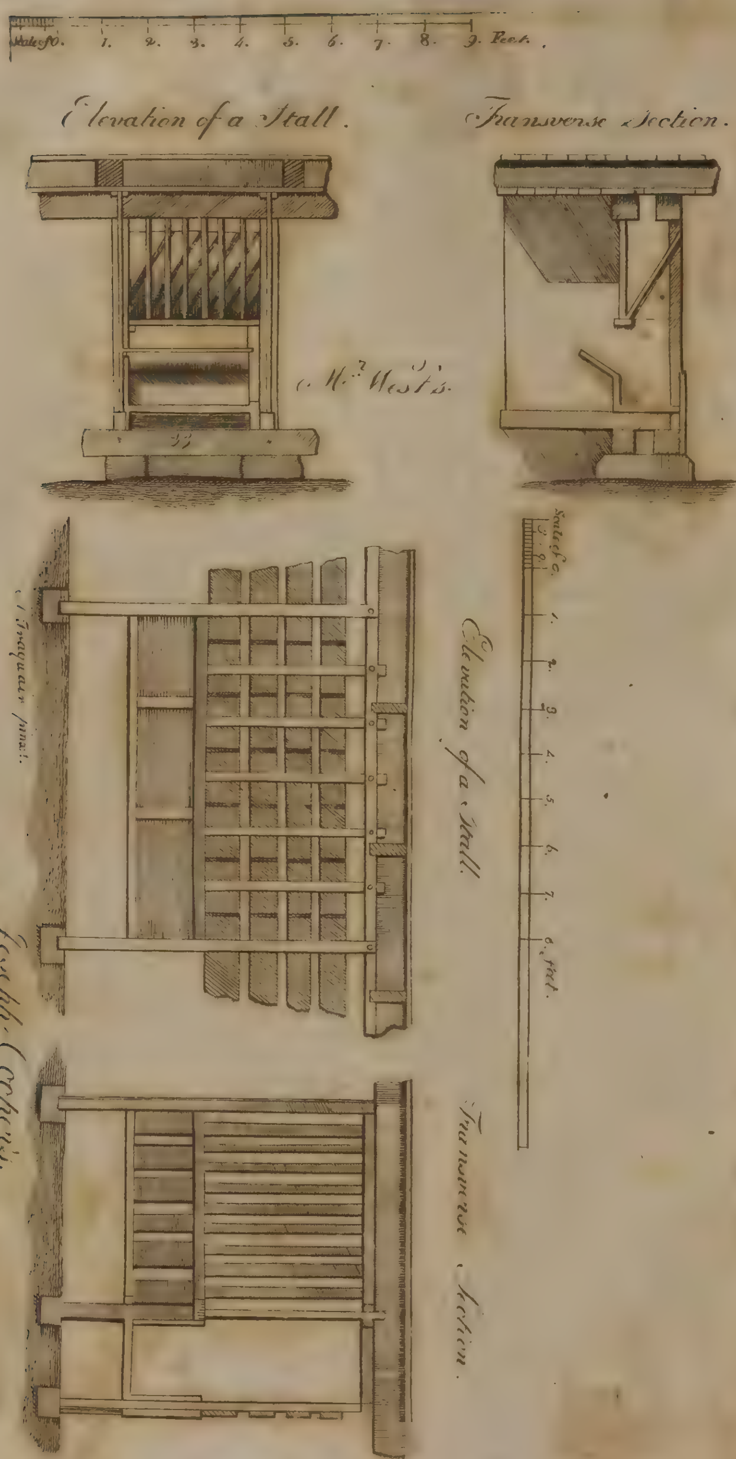
The advantage of this plan is, that if the hook breaks, it is much more easily supplied by a new one when welded to the hinge, than when the hook is in the wall and the eye in the hinge.

The threshing floor is let into a rabbet, in the cross girder. The rabbet is about five inches deep. The partition between the mows are scribed down to the floor, and nailed to the rabbet, and thus the leaking of the grain, which is so seriously complained of by most farmers, is prevented.

The floor is of white oak plank, well seasoned, and the boards broad; both edges are grooved, and put together with tongues. The sill of the threshing floor, is a long stone, and the upright post of the frame rests upon two stones which join the one forming the sill. By this arrangement there is little inequality in the rise from the bank, and the wheels of the cart or waggon go over easily.

The joists are of saplin hicory trees, cut and barked in the spring. Mr. D. says, such joists are more durable and stronger than any other which can be put in a barn: and that trees cut and barked in the spring, escape attacks from the wood worm, whereas if the bark be permitted to remain on a felled tree, it will inevitably be attacked in the course of the season.

Mr. D's barn is 61 by 37 feet: but he observed that the nearer a barn approached to a square, the more economically it might be built.


Scale of 0. 1. 2. 3. 4. 5. 6. 7. 8. 9. Feet.
Elevation of a Stall.
Transverse Section.
Mr. West's.
Elevation of a Stall.
Transverse Section.
Joseph Cooper's.

The racks of Mr. Wm. West's stalls are upright, and the perpendicular falls on the inner edge of the trough below, which has a shelving leaf, as represented in the plate. When a beast pulls out the hay, some will fall on the leaf, and thus slide down into the trough, where it is secured from the breath of the animal. The distance between the bottom of the rack and the trough is sufficiently great to permit the heads of the animals to enter, in order to get at the dropped hay. The racks are 1½ feet deep, and two feet at top from the edge of the rack: they are planed within, and thus the hay falls to the bottom of the rack, as it lessens in quantity; and the cattle saved the pain of a long reach, which they are obliged to make in the common stables.

Mr. W. feeds from the entry, which is six feet wide. The hay is dropped through a trap door from the mow above.

The construction of Mr. J. Cooper's stalls may be easily understood from the plate. The upright slats prevent the horses from wasting the hay, or from blowing on it. For the animals cannot look round, which they are very apt to do, when a person enters the stable; neither can they run their heads over the whole trough; the slats oblige them to feed directly before them.

Mr. Morgan's "stalls have a fixed iron chain, by way of a halter, to prevent the cattle from turning round and dunging in their mangers. This chain is fixed by a staple to the front sill of the manger, and consists of two parts: One has 16 links, and is two feet long, measuring from the staple: The other, containing 26 links, measures about 39 inches, and serves as a collar. This collar-chain has, at one end, a ring about one inch in diameter; and at the other end, a key three or 4 inches long, having a hole at its middle, by which it is joined to, and freely plays in the last link. The first chain, which, by one end, is fixed to the manger, is, by the other, linked into a middle link of the collar-chain; and thus forms two arms; which, being thrown round the neck of the beast, and the key thrust through the ring, and placed at a bar across it, make a very secure fastening....The collar-chain for a horse is like that just described; but the chain linked to its middle must be 3 feet long, and may be fixed to a standard, mortised into the sill of the manger, and the joist above." *Columb. Mag.* 1786.

A very convenient barn, coach-house, and stable, under one roof, was built a few years since, by D. Peterson, Esq. on Mount Prospect, Bristol road, upon the general plan of Mr. Duffield's, though improved. It is of the just proportions of 36 by 45 feet, and 18 feet to the eves. The bridge is in the middle of the building on the longest front, and was raised to the threshing floor, the building having been erected on a level. The door is 12 feet wide and 12 high. The depth from the top of the bridge to the ground is seven feet: on one side the bridge, and below, is a window; on the other side is also a window, but opens into a latticed crib, which answers to keep corn, and extends to the level of the top of the bridge: below it, is a poultry cage with roosts and proper divisions, and extending to nearly three feet of the ground: in the lower division ducks are

kept: this poultry cage is continued round against the side of the bridge.

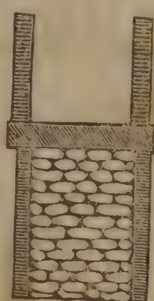
The coach-house A, (See the Plate), is 18 by 20 feet, and is on the same front as the stables; next to the coach-house, is a shed C 10 feet wide; under this shed, which is the whole length of the barn; carts, waggons, and the farming utensils are protected from the weather; the top of this shed ought to be on a line with the roof of the barn, to prevent chaff and dust from remaining on the shed, and thereby rotting the shingles. The upper part of the shed and on the level with the threshing floor, over Cc are the bins for grains on the one side, and a corn crib, or store room on the other over C.

The entry between the stable and coach-house is 4 feet wide. EE are cow stalls: over these, on one side of the threshing floor is a hay-mow: on the other side of the threshing floor, over the coach-house and stalls, is another mow, which is divided by the stairs at D.

In the annexed Plate is represented the plan of a substantial and convenient barn and stables, built by Mr. John Miller, stone-cutter, of Philadelphia, at his farm in the Valley, Chester county, Penns.... For this the Editor is indebted to his friend Mr. A. Traquair Jun. The following particulars respecting the construction of this barn, deserve attention:....All the wooden sills of the internal doors or hatches, are raised above the common floor, to prevent their decay. The external doors have sills, jambs, and lintels of stone. The divisions are by stone walls, and are covered with two-inch plank..... The intention of this is to preserve the walls, for commonly they are left uncovered, and the top stones are frequently displaced.

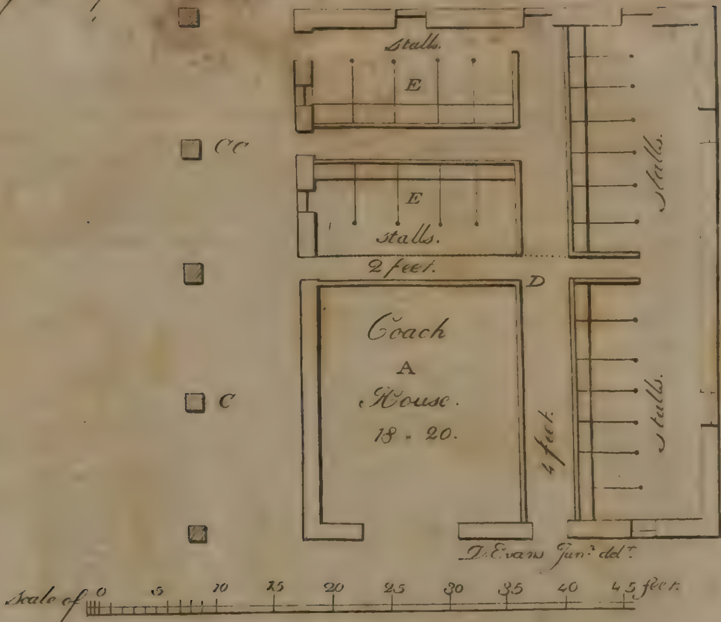
A staunchion rises from the middle of the coping, and is connected with the timbers of the floor above, thereby throwing some of its pressure upon the partition walls....thus,

Mr. Miller suggests the propriety of placing two staunchions at each edge of the wall, to fix the coping more firmly....thus,

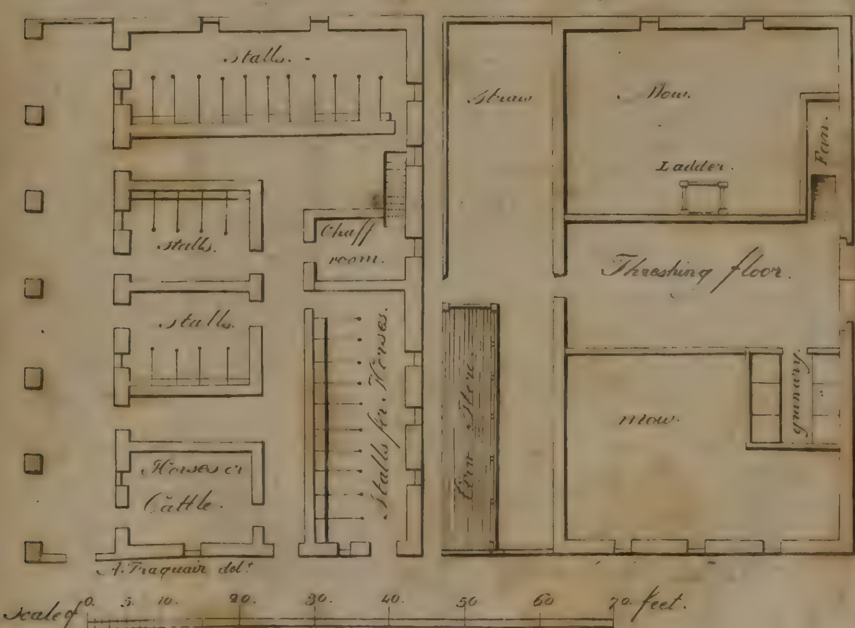


Slabs of stone, three or four feet long, would be more durable, and when used, the staunchions will be unnecessary, stone being sufficiently weighty to resist a common impulse, which might displace a

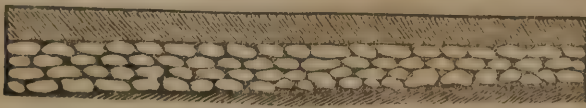
Ground plan of Mr. Peterson's Barn & Stable.



Plan of Mr. T. Willet's Barn & Stable.



plank. The range of stalls, ten in number, are contrived so as to accommodate large and small cattle, by a descending floor, thus,



Two white-oak girders divide the barn into three parts longitudinally, which sustain the weight of the joists and floor, and of the immense quantity of hay and grain which this barn is capable of holding. Each girder is composed of two pieces in length, and 14 by 10 inches square, to prevent them from swagging....thus,

10

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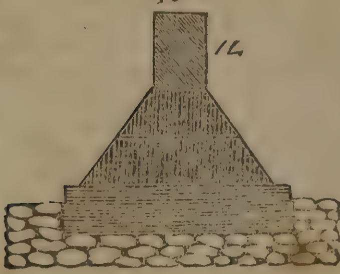


The threshing floor is double, the lower floor is of white pine, the upper of heart pine. This method, though more expensive than Mr. DUFFIELD'S, effectually prevents any grain from being lost, as the upper floor covers the joints of the lower floor.

The whole barn is plastered, and there are Venetian blinds to all the windows.

RATS are well known to be highly injurious to grain in barns, as well as to ice-houses, and dwellings. An effectual mode of securing all buildings against them, shall be fully described under the article RATS.]

Farm-Yard Manure.

" For conducting the business of a farm to full advantage, the farmer is to pursue objects which systematically embrace such a regular course of particulars, as shall best follow and depend on each other, for obtaining the one whole of the design of farming. It is not immediate product alone that we aim at; for, whilst we wish to obtain repeated full crops, our reason assures us, that it is indispensibly necessary to that end, that the soil be preserved in full vigour. The mind then is employed, principally, on the objects of *preservation and improvement of the productive powers of the earth.* Observations on the state of common farming fix the opinion, that no unconnected, random pursuits, tend to ensure a succession of advantageous husbandry, for any length of time.

Well chosen rotations of crops, together with due culture, are believed to be so favourable to the ground as to need but little manure in comparison of what the common or ill chosen crops absolutely

require. Still the steady and attentive application of *manures*, is held to be an essential duty in farming, a great link of the chain, in every instance. If rich soils require, comparatively, but a moderate quantity, in a rotation where ameliorating crops are prevalent, yet middling and poor soils want all that can be obtained; and, under the *old Maryland courses especially*, all soils eagerly demand *more manure than can be readily procured*. These exhausting courses we see continually impoverish the soil. Too many farmers, therefore, incline to move to fresh lands; where they would precisely act the same murderous part over again.

The principal links in good farming, are, due tillage, proper rotations of crops, which are treated of above, and manures, of which it is wished the occasion would admit of more than the few observations which follow.

In the American practice, hay and fodder are stacked in the fields; and the cattle are fed round the stacks and fodder-houses: the disadvantages whereof are,

1. A wasteful use of the provender.

2. The *dung* lying *as it is dropt* without *straw*, or other vegetable substance brought to it, the manure is little in quantity; and,

3. That little *not lying in heaps*, is reduced abundantly by *exhalation* and *rain;* without leaving any thing to the soil.

In the English and Flemish practice (feebly observed by a few of our husbandmen), *cattle* are carefully housed, or otherwise confined to a fold-yard, in which are *shelters* against cold rains, during the whole winter, and as far through the spring as food will last: the advantages of which, are,

1. A fair expenditure of the provender, *without waste*.

2. Less *exhaustion* of the juices; because of the dung lying together in large heaps.

3. The dung being mixed with the *straw*, and other vegetable substances brought to the beasts as litter, the whole is trod together, and forms a large quantity of very valuable manure.

It may be no exaggeration to affirm, that the *difference* in the quantities of manures obtained from an equal stock of cattle by those several methods, may be as three to one. If six acres may be annually manured by the inferior method, then may eighteen by the superior. Now, on a supposition, that manured land is kept in heart five years, without repeating, in the one case but thirty acres will always remain in good order; in the other, ninety acres: a very important difference. Indeed it is all the difference between an husbandman's poverty and his riches.

Do cattle, when foddered round hay-stacks and fodder-houses, or ricks, give twelve loads of manure each? Do they yield one such load? It is a fact stated, I think by Mr. Young, that, in the course of a winter, cattle kept up and littered *in a yard*, have yielded full twelve such loads, each beast; and if soiled or fed well during the summer, with cut green grass, or clover, they may be expected to yield more and richer manure; especially when they are kept up, on a full quantity of litter. Here, by the way, it may be noted, that a portion of grass only sufficient to keep one beast in pasturing, has sufficed five in soiling: and what is of immense importance to the state of

the ground and of future crops, the ground being *untrod*, in soiling, is left light and mellow. Another favourable circumstance attends soiling: the beasts are kept in shade, and considerably protected from flies; especially when the house is kept dark during the heat of the day, with only air-holes near the ground and above their heads.

"It will be said, the ground round the stacks receives the dung dropt, as a dressing to so much of the field. But we know this extends to a very small distance, and the effect is in no part considerable. The place chosen is some eminence; the rains and winds of half the year, wash away and evaporate from the frozen ground most of the rich substance of the dung so dropt about; and the ground, whilst unfrozen, is trod close, and poached to a degree that untills it nearly equal to the value of the dung left on it uninjured. This is illustrated, a fodder-house, (a hollow rick made of maize tops in the way of thatch), was set up in a field, as is usual; it was fenced in. At the south front, maize was husked, and the husks were sheltered in the fodder-house. In the course of the winter they were given out to cattle, in front of the rick. In April, the fodder-house being then empty was pulled down, and the covering of maize tops was given to the cattle. The ground thus *sheltered* by the fodder-house for six months, October to April, shewed marks of richness greatly superior to the ground on which the cattle were foddering during the same time: grass, weeds and crops, during the four or five following years of my remaining on the farm, shewed this in their great growth. Where the fodder-house, three hundred feet long and twenty broad, stood and sheltered the ground, the richness of the soil was strongly marked; when but a faint superiority over the common field appeared on the part where the cattle were foddered.

Litter is an essential, to cattle when let into *yards*, without which *yard manure* is of small account; and, unless it be in *full proportion* to the number of cattle in the *yard*, it is not thought highly of; but is as a half done thing. Good farmers in England deem *full* littering of cattle, when in *yards*, of such importance, that, after reaping with sickles and inning their wheat, they cut the *stubble* and stack it for litter. Besides straw and stubble for litter, they apply to the same use, fern, and such other vegetable substances as they can procure: and they buy straw from common farmers who are not in the practice of littering. In all countries, common farmers are indifferent to improvements: they look not beyond old habits; and it is prudent that they venture not on extensive new projects, without first making experiment. A full littering is three loads of 12 or 1300lb. of straw to each grown beast. Maize stalks may be carried from the field in great quantities, in a skeleton frame cart, if not cut up and fed when fresh, they are more nourishing, owing to the saccharine juice with which they abound."....Mr. Bordley.

Many farmers feed in their yards in racks, and suppose that they gain every possible advantage from the practice, by the saving of the dung dropped, trampled and watered by the cattle; and though this practice is certainly preferable

to wasteful pasturing, or to feeding in racks in the fields, yet it ought to be recollected, that the manure will be much inferior to that made and preserved under cover. Mr. Young justly observes, *Annals* 14. p. 161. That "a great deal of trampling in a large surface, gives a very fallacious appearance of rottenness, for it arises only from rains, which should, if possible, be kept away: it is not water but urine that is the proper ferment for dung: the treading of dung as fast as it is made impedes fermentation. It ought, on the contrary, to lay loose and untrodden for the air to penetrate it. But there are other objections which may be offered against the practice of yard feeding, viz. Danger from a vicious beast injuring another; the irritation arising from their contentions for food, and worrying by flies, all of which are avoided by feeding in stalls under cover.

Where cattle are yard fed, or stall fed in yards, under sheds; it is of great consequence to defend the beasts against the cold and damp N. E. winds, and the cold blasts from the N. West. Mr. E. Duffield, therefore, advised a friend who wished to have a complete farm-yard, to erect a range of buildings in a S. E. direction, to have double stalls below, leaving the S. W. and S. E. sides open, to admit the sun in the winter, and give free entrance to the prevalent winds in the summer.]

FARRIERY, the art of preventing, curing, or alleviating the disorders of horses.

The practice of this useful profession has, till within the last 15 or 20 years, been almost entirely confined to a class of men, who were utterly ignorant of the anatomy of the horse, and the general principles of the art of healing. Their prescriptions were as absurd as the reasons they assigned for administering their draughts, bolusses, drenches, &c. An institution has at length been established where the diseases of that noble animal, the horse, are the subject of peculiar attention; we mean the *Veterinary College*, which we are happy to state, is patronized by the most respectable of the nobility and gentry.

As, however, in this work, we treat of the principal diseases, as well as the shoeing and general management of the horse, in their alphabetical order, we shall here only mention a few of the most esteemed works published on farriery; namely, Mr. Clark's "*Treatise on the Diseases of Horses*" (8vo. 8*s*. 6*d*.); his "*Observations on the Shoeing of Horses*" (8vo. 4*s*.); Mr. Taplin's "*Gentleman's Stable Directory*" (2 vols. 8vo. 15*s*.); Mr. Lawrance's "*Philosophical and Practical Treatise on Horses*" (2vols. 8vo. 17*s*. 1797); [and likewise, Riding's *Veterinary Pathology*, just published;] from which the inquisitive reader may collect the latest and most essential improvements.

Concerning the propriety of administering Horse-balls indiscriminately, on the suggestion of ignorant blacksmiths; or of resorting to the most absurd external applications, such as Bags for recovering a lost appetite, while the *proper* internal remedies are neglected, we shall briefly remark, that such conduct is equally injudicious, as the blind reliance on quack-medicines; though it were to be wished, that the latter may be exclusively given to horses and other cattle.

Farthing-bound. See Cow.

FASELNUT, or *Areca catechu*, L. one of the most curious Indian plants, which attains its greatest perfection in the island of Ceylon.

It grows to the height of 25 or 35 feet, without any branches, but has very beautiful leaves; the trunk is remarkably straight, and the leaves form a round tuft at the top. Its fruit is contained in a yellowish shell, externally smooth, but rough and hairy within, resembling that of a cocoa-nut, though in size not exceeding a large walnut; its kernel is not unlike a nutmeg, and contains in its centre, while soft, a greyish and almost liquid substance. The ripe fruit is astringent, and its consumption in the East Indies is perhaps more general than that of tobacco in Europe; as every person chews it, together with the leaves of betel, after mixing with it lime made of sea-shells. This mastication occasions much spitting, cools the mouth, and fastens the teeth and gums; it is likewise said to sweeten a *fetid breath*, and to strengthen the stomach: for these conjoint purposes, it may, even in our colder climate, be advantageously employed; and as we possess perhaps no plant of a similar efficacy, it might be easily imported.

FASHION, in general signifies the prevailing mode of taste, and is particularly applied to dress. In this respect, it frequently supplies the place of reason; especially when the two principal rules, namely, *propriety* and *conveniency*, are neglected.

We cannot enlarge on this article, which, though it frequently undermines the health of blooming youth, and frustrates the fondest hopes of parents, yet is supposed essentially to contribute to the flourishing state of trades and manufactures; hence we doubt, whether the most appropriate censure of that tyrant, whose shrine is revered by all the young, the gay, and the frivolous, would be productive of any good effects. This much, however, we venture to say, that *fashion*, when trespassing either on the rules of health, propriety or convenience, ought to be universally exploded; and treated with a similar degree of silent contempt which *moral and political innovations* generally experience, when they are not supported by a just and solid basis.

FASTS, or Fasting, denotes abstinence from food, particularly for religious reasons.

Fasting has been transmitted to us from the earliest ages, as a duty necessary to be performed at certain periods, in order to deprecate those calamities, with which the innate depravity of man is said to be justly punished.

Having already considered the effects of *fasting*, under the head of Abstinence, we shall only add, that it is particularly injurious to tender and debilitated habits in the early part of the day; because the fluids of the human body, after circulating for several hours without any alimentary refreshment, at length acquire a putrid tendency, which is obvious from the strong alkaline breath of the most healthy person, after rising from his nocturnal couch. There are, however, instances of fanatics, who have subsisted for many days, and even weeks, without any sustenance; but, though such persons may occasionally survive these unnatural attemps, yet their health

is, in consequence, miserably impaired.....Similar effects often arise from a *total* abstinence from animal food, whether on account of religious or other motives....Thus a late Professor in the University of Glasgow, shortened his life, by abandoning the use of flesh meat at an age exceeding 60 years; and, after living upon vegetable aliment about six months, he was reluctantly obliged to resort to his former mode of diet; but these changes had so unfavourably affected his constitution, that he died in a very short time after making the experiment.

FAT, an unctuous, solid substance, deposited in little membranous cells, in various parts of animal bodies: it serves to defend the muscles and bones against cold, to temper the acids of aliments, and probably to the support of the whole frame.

The fat of several animals was formerly kept in the druggist's shops, as hog's-lard, the fat of deer, geese, and also human fat....With respect to their real virtues, much depends on the manner in which they have been purified and preserved.

The method of preparing fat for medicinal purposes is, to remove all veins, skins, fibres, &c.; when it is to be washed, till the water comes from it perfectly insipid and colourless. After this preparation, the fat is to be melted by a gentle heat, with a small quantity of water, till the latter be evaporated; it is then to be strained off into an carthen vessel where it will settle, and be preserved from the air. When thus purified, fat is almost totally divested of taste, and smell.

With regard to the properties of fat, and marrow, when used as food, they produce a solid and nourishing juice, increase the blood and fluids in general; but are difficult to be dissolved, and apt to become rancid on the stomach of many persons, whose digestive powers are weak, and who are not accustomed to take much exercise. Hence, if fat be not duly assimilated to the fluids, it impairs the stomach and bowels, occasions diarrhœas, heart-burns, head-achs, and spasms, especially in those whose habits are easily irritated.

FAT-HEN. See Wild ORACHE.

FATNESS. See CORPULENCY.

FATTENING OF ANIMALS. See BULLOCK and CATTLE.

FATTENING of COLOURS, is a term employed by painters, and signifies a coagulation of the oil, which is occasioned by mixing it with several kinds of pigments.... hence, when it has been kept for a considerable time, it becomes so viscid and glutinous, as to be wholly incapable of being worked either with the brush or pencil. In this state, a due proportion of fresh oil should be added.

Colours will also *fatten*, after they have been laid on the proper ground; so that one part of the oil will run off in small streams or drops, while the other adheres to the canvas with the colours, but without drying....This defect, we conceive, may be remedied by evaporating the watery parts of the oil, and grinding the colours more carefully, so as to prevent their precipitation.

Oils will likewise *fatten*, when they have been too long kept, or exposed to the sun and air.

FEA-BERRY. See Rough GOOSEBERRY.

FEATHER, a general name, expressing the covering and wings

of birds, by which they are enabled to fly.

The feathers chiefly used in this country are those of geese, from which animals they are plucked three, four, and even five times in the course of one year: thus, in cold seasons, many of these birds fall victims to that barbarous custom....The feathers obtained from the county of Somerset are esteemed to be the best, as those brought from Ireland are reputed to be the worst.

Great quantities of goose and other feathers are annually imported from the North of Europe; which, however, are insufficient for the demand: hence poulterers dispose of vast numbers of the feathers of cocks and hens, and also of ducks and turkies; all of which are much inferior to those of geese.

The best method of curing feathers is, to expose them to the sun in a room; and as soon as they are thoroughly dry, to put them loosely in bags, in which they should be well beaten, in order to cleanse them from all dust and filth.

Feathers are chiefly used for the stuffing of beds, which are certainly less wholesome than wool or horse-hair matresses, and tend greatly to relax and enervate the human body. Within the last two or three years, they have been manufactured into hats; a mode of employing them far preferable to that we have just mentioned....See PLUME.

FELT, a kind of stuff, which derives its consistence merely from being fulled or wrought with lees and size, without being either spun or woven. The mechanism of felting is equally simple and curious; though its *theory* is little understood, even by professional hatters. ...As the surface of hair and wool, is by no means smooth, but formed either of plates resembling the scales of fish, or of zones placed over each other, as we find in the structure of horns, it follows that hair or wool, when promiscuously entangled, cannot be easily disengaged, on account of its rough sides, which may be readily perceived, by drawing a hair between the fingers against the root-end. Thus, each inequality of surface accommodates itself to that of another hair, and forms at length a natural texture.

Felt is made either of wool alone, or of a mixture of that article with camel's or other hair, and is used principally in the manufacturing of HATS, to which we refer.

FEN, a place overflowed with water, or abounding with bogs.... See BOG and DRAINING.

The most extensive fens in this island, are those of Lincolnshire, which afford considerable advantages to the inhabitants, who take large quantities of fish, and wild fowl: the latter are even sent to the London market.

Fens generally abound with saline plants, which are very nourishing to cattle, and exceedingly fattening to sheep and horses. Oats will also thrive well in several fen districts; and, in prosperous seasons, yield abundant crops.

Coleseed is likewise cultivated to a very considerable extent on the fens, which indeed might be made more fertile, if the practice of paring and burning them, to the depth of an inch and a half, were more generally adopted.

FEN, the name of a very pernicious disorder, to which hops are subject. It consists of a kind of

moss, or mould, which grows rapidly, and does considerable injury to the hop-grounds, unless it be eradicated immediately on its first appearance.

FENCE, in rural economy, is a hedge, wall, ditch, bank, or other inclosure, made round gardens, woods, fields, &c.

The fences employed for parks, and sometimes for gardens, are generally of paling; which, if made of *winter-fallen* oak, will continue sound for many years. For this purpose, the pales should be cleft thin, and the rails cut triangular, in order to prevent the wet from being deposited on them. In parks where fallow-deer are kept, it will be sufficient if they be 6½ feet high; but where there are *red* deer, it will be requisite to make them at least one foot higher.

Various kinds of *plants* have been recommended for constructing the common fences, of which we shall point out the principal: 1. The White-Thorn is the most proper for fences, as it grows quickly, is very durable, and makes a very handsome appearance. It thrives on any soil, where a ditch and a new bank are prepared for its reception, unless the soil consist entirely of sand or gravel: it will nevertheless grow even in such situations, if the planting be succeeded by heavy rains. 2. Black-Thorn is another excellent shrub for a fence: it is, however, much inferior to the white-thorn, as its growth is not so certain; and, where it thrives, its roots spread, and are apt to *run in* too much upon the land. For dead hedges and mending open places, the bushes of this plant are superior even to the white-thorn; they are likewise less liable to be cropped by cattle. 3. Furze, to which we refer. 4. To these may be added, the Holly, which is indeed preferable to either of the plants, above-mentioned; for, though its growth is slower, and more uncertain, yet where it succeeds, it amply compensates for the delay and expence incurred, by its thickness, height, and strength.

The best mode of making a fence with these trees is, to plant them with the quick or white-thorn, in the proportion of one of the former to four of the latter. Both will flourish; and, as the hollies increase in size, the white-thorns may be pulled up: so that when the trees have attained their full growth, they will require the whole of the space occupied by the thorns, and will make a most durable fence.... If any vacancies should intervene, they may be easily closed, by bending down, and covering the lower branches with earth: thus, they will shoot forth in the ensuing year, and form a barrier impenetrable to cattle.

Beside these, alder, and even elder, make, in certain situations, excellent fences. If sticks or truncheons of the latter, from ten to twelve feet in length, be set in a sloping direction each way, so as to form a kind of chequer-work, they will grow speedily, and continue for several years. This plant is excellently adapted to watery places, as its lowest roots are continually spreading, and thus prevent the banks on which they stand, from being undermined, or washed away by the current.

The last tree which we shall mention, is the Horn-beam. It is chiefly used in Germany for the purpose of fencing lands; and is propagated from sets or slips, which

are planted on a parapet of earth, with a ditch on each side, in such a direction, that every two plants may intersect each other. The bark is then scraped off the place where they meet, and which is covered with bands of straw: in consequence of this operation, the two plants become conjoined, and put forth horizontal slanting shoots, forming a kind of palisade; which, if lopped annually, will render every part of the fence equally impenetrable to men and cattle....See HEDGES.

[The daily growing scarcity of wood in the United States, renders the inclosure of a farm, very expensive. It behoves the farmer, therefore, to adopt every means to preserve his fences. It is well known, that the decay of posts almost universally commences at the surface of the ground, and proceeding gradually to the centre, eats through the post. To prevent this, many farmers are in the practice of charring the post a few inches above and below this part. This practice is highly proper.... Charcoal is known to be indestructible by the common causes of decay, by which wood is destroyed.... It has been suggested, also, by a writer in the *Philadelphia Magazine*, June, 1798, to charr the ends of the posts, and even the whole fence; to place the broad part of the rail uppermost, and the angle downwards; to prevent the lodgment of rain.

The cedar rails brought to Philadelphia, generally come from the immense swamps of Delaware and New-Jersey; and are made in so slight a manner, as greatly to diminish their natural tendency to durability. In a grazing farm, where cattle pasture at large, it is of the greatest consequence, to have strong rails, in order to resist the violent attempts to level them, which are frequently made by unruly beasts. Mr. WM. WEST, of Delaware county, therefore, who does every thing about his farm in the best manner, procured his rails from Jersey, eleven feet long, and had them split in the manner of square rails, strong and thick, in preference to broad-rail fashion.... The mortices in his posts, are $2\frac{1}{2}$ inches wide.

These directions are worth attention by the farmer, in whatever plenty he may have wood for fence, because the time which will be saved to him, by not being obliged to renew his fence every seven years, is a great object: but to persons living near the great towns, wood is a serious expence: and we ought to begin in time to plant *hedges*, to inclose our grounds.... The most proper mode of planting these shall be fully disclosed under the article HEDGE. See also INCLOSURE.]

FENNEL, the COMMON, or Fennel Dill, *Anethum fœniculum*, L. a native perennial plant growing on chalk cliffs, and common on the western coasts. Its yellow flowers appear in July or August.

The tender buds of this aromatic plant are useful in salads; its leaves are boiled and used in sauces for several kinds of fish, and also eaten raw with pickled salmon, &c.... The seeds yield an excellent aromatic oil, which is carminative, resolvent, and diuretic, without heating the body: on account of these valuable properties, as well as for its strong, pulpy, and esculent root, this plant is industriously cultivated on the continent: it delights in a rich, but not too moist

soil; and the seed is put in the ground soon after it becomes ripe.

There are two varieties of this excellent vegetable reared in Italy, both of which might be cultivated in Britain; namely, 1. The *dulce*, or sweet fennel; and 2. The *azonicum*, or Italian fennel. The former easily degenerates, and requires a frequent supply of seeds produced on its native soil; the latter is a delicious plant, the stalks of which according to Bechstein, are thick, pulpy, and from four to five inches broad: they are highly esteemed by the Italians, who blanch and eat them as salad, prepared with flour, vinegar, and pepper. Hence the popular adage in that country, according to which "fennel and bread are the Italians' repast."

Fennel, the Water: See Water Starwort.

FENUGREEK, or *Trigonella fænumgræcum*, L. is a native of the southern parts of France, Germany and Italy, whence its yellowish seeds are annually imported.... They possess a strong, disagreeable smell, and an unctuous, farinaceous, and somewhat bitter taste. These seeds are chiefly employed in cataplasms, and fomentations, for softening, maturating, and discussing tumors: they are also occasionally used in emollient and carminative clysters.

FERMENTATION is, strictly speaking, a chemical process, and one of the most obscure phenomena in nature, which all the ingenuity of philosophers has hitherto been unable to explain. Instead, therefore, of perplexing the reader with different theories on the subject, we shall briefly relate the practical part of this interesting process, together with the circumstances attending it.

Fermentation may be defined to consist in a visible internal commotion of different bodies, reduced to a fluid state; emitting bubbles of air, and a sparkling pungent vapour. But, more properly speaking, it is a gradual and spontaneous change of a body, consisting of different ingredients variously mixed, and which are now decomposed and converted into a vinous liquor. Thus we obtain, according to the methods afterwards pursued, wine, ardent spirits, beer, or vinegar....Hence fermentation is confined to the vegetable and animal kingdoms; and is divided into *three* regular stages; namely, the *vinous*, *acetous*, and *putrefactive*. Vegetables only are susceptible of the first; the flesh of young animals in a slight degree undergoes the second; and all animal substances are peculiarly subject to the last stage, or putrefaction.

The most essential requisites in every process of fermentation, are: 1. That the substances be in a fluid state; 2. That there be a proper degree of uniform warmth, that is, in general between the 70°. and 80°. of Fahrenheit's thermometer: and 3. That the atmosphere be not entirely excluded from the fermenting bodies, nor that they be exposed to a current of air.

If, in the elementary mixture, or component parts of a vegetable body, there exist a portion of inflammable air, this spirituous ingredient will be disengaged at the very commencement of fermentation: hence we obtain wine, brandy, cider, beer, &c. from grapes, apples, pears, and other fruit, from

every species of corn, as well as from saccharine and mealy roots. Their productions, however, so far differ from each other, that wine contains a greater proportion of spirituous, and less of mucilaginous particles, than beer; and that distilled spirits are deprived of all earthy and viscous ingredients. But, as all fermentable bodies, beside the inflammable spirit, possess a portion of acid and saline particles, which are not disengaged during the first, or *vinous* stage of fermentation, another separation of constituent parts takes place, immediately after the former is effected, without any farther discharge of air-bubbles, or intestine commotion of the fluid; though a volatile elastic vapour is observed to escape: thus, the spirituous parts, unless they have been previously drawn off by distillation, are communicated to the atmosphere, and this stage is termed the *acetous* fermentation; because its productions are the different sorts of vinegar obtained from wine, beer, fruit, corn, &c....Although, in most of the fermentable substances, these two stages naturally succeed each other: yet, by improper treatment, the acetous fermentation sometimes appears before the vinous can possibly commence, especially where the process is mismanaged by too great a heat; or, in those bodies which possess little or no inflammable matter in their elements. On the contrary, such vegetables as originally contain a sufficient proportion of *aerial* and *fiery* constituents, will easily ferment, by the simple means of warmth and water. But, if those elementary ingredients be in a manner deprived of their activity, by too many crude and viscid particles being combined with them, it will then be necessary to make certain additions, partly natural, and partly artificial, in order to dispose them more readily to ferment. These means, or additions, are such as have either already undergone fermentation; or are easily disposed to ferment: of the former kind are *yeast* and *leaven*; of the latter, honey, sugar, especially in a state of molasses, and other sweet substances, which, however, but slowly promote fermentation; nay, if they be previously diluted or dissolved in too hot water, and in that state added to the fermentable materials, they will entirely check that process. There are, besides, other means of promoting it; for instance, the dried leaves of the vine in a state of powder; cream of tartar, especially after it has been repeatedly moistened with strong vinegar, and afterwards dried; the crumb of bread prepared in a similar manner, and reduced to powder, &c.

If fluidity, warmth, and fresh air, forward the fermentative process, the contrary of these, namely, dryness, cold, and exclusion of air, inevitably tend to prevent it.... There are, however, cases in which it may become necessary to impede its progress; and we may then safely resort to the means above alluded to....But *a certain degree of heat*, such as we have before stated, appears to be indispensibly necessary to conduct that process with success: an undue continuance, or the least increase of heat, proves detrimental, while an appropriate temperature, in a remarkable degree promotes fermentation. These different points of heat should be accurately noted and settled by the thermometer, or other certain me-

thods; though, for common, or all economical purposes, they may be limited to what is in general termed a *tepid* and a *fervid* heat: the former is the bane of all vinous fermentation; the latter, or imperceptible warmth, is the great promoter of it. And if, notwithstanding a due attention to a proper temperature and all other circumstances, the liquor will not work of itself, it should then be assisted by such substances as are called *ferments*, and of which we have already given some account.

In the Memoirs of the *Philosophical Society at Manchester*, Mr. HENRY states the result of some experiments, in which he produced a fermentation both in bread and wort, and even in punch and whey. Conjecturing, therefore, yeast to be simply a quantity of fixed air detained among the mucilaginous parts of the fermenting liquor, he boiled some wheaten flour and water to the consistence of a thin jelly, which he put in the middle of Dr. NOOTH's machine for communicating fixed air to water. A considerable portion of gas was absorbed; and the next day the mass was in a state of fermentation.... The third day it bore so great a resemblance to yeast, that an experiment was made on some paste for bread; for which purpose it answered tolerably well, after being baked four or five hours.

Mr. HENRY made another experiment with some wort only; part of which was impregnated with air in the same manner as the flour and water, and when poured into the remainder, a brisk fermentation ensued in 24 hours; a strong head of yeast began to collect on the surface, which on the third day was fit for tunning. In the course of the experiment, good bread was made with the yeast taken off the surface.

The dispute which has arisen concerning Mr. HENRY's mode of producing fermentation, may be easily decided by a comparative trial. Let two gallons of wort be put into a separate vessel, and kept in a moderate heat for a certain time: let also two other gallons be impregnated, either wholly or in part, according to Mr. HENRY's method, be put into a similar vessel and deposited in the same place. If the fermentation commence in the liquor impregnated with fixed air sooner than in the other, the air may be rationally conjectured to induce such fermentation. At all events, Mr. HENRY's experiments, with respect to bread, are certainly decisive, and those relative to liquors may thus be easily ascertained; an object of the utmost importance to the public.

[A true theory of fermentation is not yet settled: and it is foreign to the nature of this work to enter upon the subject. The reader is referred to an admirable paper on it, by Mr. J. Collier, in the fifth volume of the *Manchester Transactions*, and to *Fabbroni's Treatise on the Arte di Fari il Vino*, published in Florence, in 1788, and translated into French by Cit. F. R. BAUD, (1801). Fabbroni denies, that alcohol is the product of the vinous fermentation, and asserts, that it is formed in distillation. See his note on the subject, *Annales de Chimie*, vol. 30, and *Nicholson's Journal*, vol. 4, p. 46: Also, some judicious remarks on the theory of Fabbroni, in a late volume of the *Journal de Physique* of Paris, by Chaptall, extracted from an admirable treatise on the VINE, in the 10th vol.

of the *Cours d' Agriculture*, published as a continuation of the same work, formerly edited by the abbe Rosier. In the paper alluded to, the singular theory of Fabbroni is ably controverted by Chaptall. The *Chemical Essays* of the late Dr. Pennington, of Philadelphia, may also be consulted.]

FERMENTED LIQUORS, are those obtained by the process described in the preceding article. See also Beer, Brewing, Cyder, Wine, &c.

All liquors which have undergone the vinous fermentation, are considered as great *antidotes to putrefaction:* hence the total abstinence from them is assigned as one of the chief causes why the Turks are more liable to the plague, and other contagious diseases, than those nations among whom beer or wine is the common beverage. It has farther been remarked, and perhaps with justice, that since the custom of brewing and distilling liquors has prevailed in Europe, many of those cutaneous as well as putrid diseases, with which our forefathers were afflicted, have been less severe, and less frequent than they occurred in former ages.

On the other hand, it is certain that all fermented liquors contain a considerable portion of air, which appears to combine the spirituous with the viscous parts, and which must necessarily be disengaged, before they are carried through the different organs of secretion. The developement and discharge of these aerial particles, however, is not effected without considerable efforts: hence it may be safely asserted, that fermented liquors are less conducive to a sound and vigorous digestion of food than plain water. Yet, with respect to their influence on the human mind, it cannot be denied that such liquors in general have the effect of enlivening and exhilarating the spirits, especially of those who are naturally deficient in mental energy, or possess a weak and debilitated frame. Some writers, however, are of opinion, that they also have a strong tendency to corrupt the morals of mankind; an effect which they evidently produce, even in temperate climates, when taken to excess. On the whole, we think a moderate use of malt liquors and wine, is less injurious to the body than the daily drinking of tea, coffee, and other *hot* liquors, which threaten to *emasculate* the present and future generations.

FERN, the Female, or *Pteris aquilina*, L. an indigenous plant, growing on heaths, in woods, and dry barren places, and flowering in the month of August.

This weed is extremely difficult to be eradicated, as its roots, in soft and deep soils, have been found at the depth of *eight* feet. One of the most effectual methods of extirpating the fern is, to mow the grass frequently; and if the field be ploughed up, and well dunged, this plant will not thrive: ....urine is said to be of considerable efficacy in checking its vegetation. It may also be easily destroyed, by means of an instrument consisting of a stick, in which is inserted a blade, with blunt edges, and with which the stems of the plant are to be bruised. Several acres may thus be cleared, even by a woman, in the course of one day: the next morning a gummy matter will exude from the injured stalk, and the fern will gradually disappear.

But, however troublesome this

vegetable may prove to the industrious husbandman, it is not altogether useless, and might well deserve to be regularly cultivated in those places where few other vegetables will grow.

For covering the roofs of houses, fern affords a valuable substitute for straw: in order to apply it to this useful purpose, it should be pulled up together with its roots, in the beginning of October, when it is perfectly pliant, and not liable to break: if these precautions be attended to, the thatch will continue sound for thirty years. It also produces excellent litter for horses and cows; and when dry, is eaten by cattle, for which purpose it should be cut from the middle of August to that of September. Hogs are particularly fond of its roots, which render them exceedingly fat; and, it has been found by experience, that if the stalks be scalded for a few minutes, and mixed with bran, for *store* hogs, half the quantity of bran will be saved; so that from February to June these animals may be kept at one half of the expense, by a weed growing abundantly on waste lands. It ought, however, to be remarked, that young pigs should not be fed with this plant, as it is naturally too heating for them, and might be productive of dangerous consequences.

Fern may also be employed as an excellent manure for potatoes; for, if it be buried beneath the roots of the latter, it seldom fails to produce a good crop....It is likewise a proper substitute for coal, where the latter is scarce, for the various purposes of brewing, baking, heating ovens, and burning limestone, as it emits a powerful heat.

The ashes of fern, when burnt, are frequently used by the manufacturers of glass, especially in France, because they afford a tolerable pure alkali....In several parts of Britain, the poorer class of people mix these ashes with water, and form them into round masses, which they call *fern-balls*: these are next heated in a fire, before they are made into a ley for scowering linen. Mr. FRIEWALD observes, in the 4th volume of the *Transactions of the Swedish Academy*, that his countrymen mix the fern ashes with a strong ley, previously to forming them into balls, and afterwards dry them: thus, a very cheap substitute is prepared for soap; and the linen washed with it, not only becomes perfectly white, but is at the same time free from that disagreeable smell, frequently contracted by linen imperfectly washed with the common soap....According to Prof. BECKMAN, fern produces the 9th part of its original weight, when burnt to ashes; and SHEFFER, in his *Chemical Lectures*, published in German, remarks, that it yields the largest proportion of ashes among all known vegetables. M. GMELIN even affirms, that it affords no less than the third part of its own weight in vegetable alkali.

Beside the multifarious use to which the fern is subservient, it may be applied to a purpose still more important. In the "*Memoirs d'Agriculture*," for 1786, we find that this vegetable furnishes the inhabitants of Palma, one of the Canary isles, with their *daily bread*: in digging for its roots, they first taste them, and reject those which are bitter, as useless. Such facts require no commentary.

FERN, the MALE, or Male Polypody, *Polypodium Felix-mas*, L. is an indigenous plant growing in woods, heaths, and stony places, and flowering from June to October.

This vegetable has nearly the same qualities, and is used for the same purposes as the female fern. In Norway, the dried leaves are infused in hot water, in which state they afford a wholesome food to goats, sheep, and other cattle, which eat them eagerly, and sometimes grow fat by their constant use....The inhabitants of Siberia boil the male fern in their ale, on account of the flavour which it imparts to that liquor. The roots, when pulverized, are an excellent vermifuge, and have been given with great success, in the proportion of two or three drams, for the expulsion of the *tænia*, or tape-worm.

[The vermifuge powers of fern are well known. It appears to be particularly active in expelling the tape-worm, which is very troublesome. Dr. G. JONES relates the case of a lady in N. York, who after taking many worm medicines with partial good effects, drank a decoction of *fern* in water, (a pint a day) until some gallons were taken, when a dose of Castor-oil brought away the remnant of the worm, measuring 45 feet!

The fern is the famous remedy of Mad. NOUFFER, of Switzerland, for the tape-worm. She acquired the knowledge of the remedy from her husband, who was a surgeon, and obtained a great price for the secret from LOUIS XVI. of France, by whose order it was published. The powdered plant was generally preferred by Mad. N. and may be given in doses of from 60 grs. to two drachms.]

FERRET, or *Mustela Furo*, L. an useful animal, which is originally a native of Africa, whence it was introduced into Spain, and subsequently into this country. It has red, fiery eyes; the colour of its whole body is of a pale yellow; and its length, from the tip of the nose to the end of the tail, is about 19 inches.

The ferret requires to be kept carefully within doors, as, unlike other wild animals, it is incapable of procuring its own subsistence. The female is of a smaller size than the male, and produces twice annually from five to six, and sometimes even eight or nine young ones, after a gestation of six weeks.

These animals are employed for the purpose of hunting rabbits, to which they are mortal enemies..... They are always muzzled previously to being admitted into the burrows, in order that they may not kill the rabbits, but only drive them out of their holes into nets, spread out for the purpose of taking them. In the west of England, they are frequently kept in farm-yards and barns, for the purpose of destroying the mice and rats infesting corn-stacks.....Ferrets are reared in casks or boxes, where they are provided with beds of hemp or flax. They sleep almost continually, and, on waking, very eagerly search for food, which consists chiefly of bread, milk, &c. They are easily tamed, and rendered docile, but are extremely irascible; and as they at all times emit a disagreeable odour, it increases and becomes extremely offensive when they are irritated.... Their motions are nimble; and they are at the same time so vigorous, that they can easily conquer a rabbit, which is at least four

times larger than its adversary.

FESCUE-GRASS, or *Festuca*, L. a genus of plants consisting of 39 species; though only 12 or 14 are indigenous, of which the following are the principal:

1. The *ovina*, or Sheep's Fescue-grass, which is perennial, grows in dry, sandy soils, and flowers in the month of June. This plant is eaten by cows, horses, goats, and especially by sheep, which are very partial to it, and soon become fat from its use.

2. The *rubra*, Creeping or Purple Fescue-grass, which is perennial, grows on elevated heaths and dry barren pastures, and flowers in the month of June. This grass is of great value in the fattening of cattle, as its succulent leaves, which continue to vegetate during the whole summer, at all times furnish abundance of wholesome food. It also possesses the advantage of retaining its verdure throughout the winter, when almost every other vegetable is decayed.

3. The *duriuscula*, or Hard Fescue-grass, which is also perennial, grows as well in dry places, as in low and flat meadows; and flowers in the month of June. It has not hitherto been cultivated, though it claims the attention of the intelligent farmer; for it frequently attains the height of three or four feet, shoots forth very early in the spring, is very luxuriant, and affords a wholesome and grateful food to all kinds of cattle.

4. The *elatior*, or Tall-Fescue-grass, which grows in boggy meadows, and at the sides of wet ditches, where it often attains the height of four or five feet. It is perennial, flowers in the month of June or July (sometimes twice in the year), and makes excellent pasture, but requires a rich soil....It is eaten by horses, cows, sheep, and goats.

There is a variety of this grass, called by Mr. CURTIS, the *Festuca pratensis*, or meadow fescue-grass, which will thrive not only in very wet, but also in dry soils. This variety possesses a property, on account of which it deserves to be more generally cultivated, namely, that of producing abundance of seeds, which speedily grow, and are easily collected. It bears a close resemblance to ray-grass, though it is in many respects greatly superior to the latter, at least, for the purpose of making and improving meadows; as it is perennial, larger, more productive of foliage, and very hardy.

5. The *fluitans*, or Flote-fescue grass, which is common in wet ditches, ponds, and marshy places; it flowers from June to September. This plant is remarkable for its small but very sweet and nutritious seeds: they are collected in several parts of Germany and Poland, under the name of *manna seeds*; and used in soups, gruels and puddings, both for their excellent aliment, and agreeable flavour. When ground into meal, the seeds may be converted into bread, which is little inferior to that made of wheat. The bran, separated in preparing the meal, is given to horses troubled with worms; but no water should be allowed these animals for several hours afterwards. Beside the useful purposes before mentioned, the flote-fescue is a valuable grass for cattle; being so remarkably grateful, especially to horses and hogs, that they will endanger their lives in obtaining it; but as it grows only in waters which have a miry

bottom, it cannot be cultivated. .....The Cottenham and Chedder cheese, in a great measure, derive their celebrity from this grass.

6. The *myurus*, or Wall Fescue-grass, or Capons-tail grass, which grows on walls, dry, barren places, and road sides; it produces violet stalks from 16 to 24 inches high, and affords a sweet, nourishing pasture: hence it might be cultivated with advantage, on the poorest soil where few other grasses will thrive.

FEVER, a general term for a numerous and diversified class of diseases; in which, after shivering, succeed increased heat and a quick, irregular pulse; while several of the animal functions are impaired, and the muscular strength, particularly that of the joints, is remarkably diminished.

In most of the febrile actions taking place in the human body, nature endeavours to remove some noxious foreign matter; and the evacuations which take place in fevers, are principally those by the pores of the skin, and the urinary passages, sometimes, also, by vomiting and diarrhœas, less frequently by hemorrhages or fluxes of blood, and very seldom by cutaneous eruptions....In the small-pox and bilious fevers, especially of scorbutic patients, a discharge of saliva occasionally intervenes, which, though it cannot be called *critical*, ought never to be suppressed.

In all fevers, there is either an increased, progressive motion of the blood, which is manifest from the quickness of the pulse; or an accelerated internal commotion of the fluids, which is obvious from the unusual degree of heat accompanying them; in most instances, however, both symptoms occur in the same individual. Hence, the proximate cause of these complaints appears to be morbid matter, contained in the fluids, and thence stimulating the nerves.... Frequently, indeed, an irritability of the nervous system alone seems sufficiently to account for the production of a febrile disease, yet in these cases, also, the *material* cause has probably pre-existed, and been only excited by the additional stimulus. On the other hand, a fever may arise from any debilitating or exciting cause; for instance, wounds, passions, acrid purgatives, &c. without any pre-disposition of the individual. Thus it may, in some measure, be explained, why rude and uncivilized nations are but seldom afflicted with febrile disorders; because these affections are peculiar only to persons of a nervous and relaxed habit.

The following facts render it highly probable, that the morbid matter of fevers is much disposed to putrefaction: 1. All remedies which are successfully administered in fevers, are of the *antiseptic* class; such as salts, acids, camphor, Peruvian bark, &c. 2. Animal food is in almost every febrile case detrimental to the recovery of health. 3. The excrements are uniformly of a putrid nature. 4. All foul matters easily produce fevers; for instance, putrid exhalations and ulcers. 5. The generation of heat is most remarkable in putrid fevers, and continues even for some time after death....It is, nevertheless, rational to suppose, that no fever can arise, even though a disposition should pre-exist in the solid parts of the body, till the nervous system becomes affected by the stimulus of acrid or morbid

particles; and till a certain degree of acrimony has been generated in the fluids.

The remote or pre-disposing causes of fever may be ascribed either to an improper mode of living, with regard to the *six non-naturals*, namely, Air; Aliment; Exercise and Rest; the Passions and Affections of the Mind; Wakefulness and Sleep; Repletion, and Evacuation: or they are to be attributed to a certain general influence; such as famine, unwholesome provisions, an unusual and irregular temperature of the air, &c.

For the treatment and cure of fever, in general, it is impossible to lay down any precepts which are applicable to every individual: we shall, therefore, confine our observations to the following points:

1. The nature of the fever ought to be ascertained by professional men, who will accordingly endeavour to remove, if possible, the proximate cause. Thus, where bilious impurities abound, they are often most effectually evacuated by emetics; where a plethora or fulness of blood prevails in the constitution, bleeding is occasionally useful; where the humours appear to be in an acrid state, it will be necessary to take diluent liquors, such as ptisan, gruel, &c. a tea-cupful every half hour, and to abstain from all solid food, eggs, and even broth.

2. To promote the *crisis*, or assist the efforts of nature by all proper means: thus, if the pulse become softer and fuller, diaphoretic or sweating remedies will then be necessary; but nothing ought to be more guarded against in fevers, than a precipitate and excessive use of *medicines*. This caution is so well founded, that the ancients cured the most obstinate and malignant fevers almost entirely by a strict attention to dict and regimen. Hence, the air in the patient's room ought to be pure, and never to exceed 70°. of FAHRENHEIT; during the cold fit, additional covering may be allowed, but which should be instantly removed, as well as all feather-beds, when heat and perspiration commence. Both food and drink must be of a cooling and diluting nature; the latter, in particular, should be plentifully given, without over-loading the stomach. All subacid, *ripe* fruit, particularly cherries, raspberries, strawberries, &c. are therefore of singular benefit in all inflammatory and putrid fevers; apples, pears, and plums being less juicy, are inferior to the fruit before mentioned, though some kinds of mellow and saccharine pears are equally proper. The juice of lemons and oranges, mixed with water, also affords a cooling and salutary beverage. In short, all those rules which we have stated under the head of CHRONICAL DISEASES, are a few modifications, also applicable to febrile complaints. Although fevers are divided, by authors, into inflammatory, putrid, bilious, pituitous, hectic, and consumptive, eruptive, sporadic, epidemic, infectious, endemic, topical, vernal, autumnal, complicated, original and symptomatic, regular and irregular; yet the following division is better calculated to answer *practical* purposes.

I. *Intermittents*, or AGUES, which see.

II. *Inflammatory fevers*, or those which are attended with an inflammation of any internal part of the body; such as the breast, lungs,

throat, &c. or some external part, for instance, the ROSE. For a description of the former kind, see PLEURISY, and INFLAMMATION.... Sometimes, however, there is no local affection discoverable, though all the symptoms of an inflammatory disposition of the blood are evident, in which case, the disorder is termed a simple inflammatory fever.

III. *Putrid fevers*, which are accompanied with certain symptoms of putridity, either in the first passages, or in the mass of the blood, or in both....These malignant fevers are highly infectious and destructive; though they have lately been most successfully treated by large doses of *fresh* YEAST, diluted with water; a cheap and easy remedy, of which we propose to give a farther account, under its alphabetical head.

IV. *Bilious fevers*, are thus denominated from an undue secretion of the BILE, to which article we refer: no time should be lost here in applying for proper advice, as they frequently terminate in putrid fevers, if mismanaged in the beginning....See also YELLOW Fever.

V. *Nervous fevers*, in which the whole nervous system is originally affected; these maladies are chiefly of modern origin, and have frequently been relieved by the proper use of the *tepid bath*. We cannot in this place expatiate upon their treatment, as they appear in a thousand different forms, and require the assistance of professional men, more than any other class of diseases.

VI. *Hectic fevers* are those which emaciate the body, and arise in consequence of the corruption of any particular organ or viscus in the system: for instance, obstruction, suppuration, or ulceration of the breast, lungs, liver, &c. See HECTIC....These fevers, however, are to be distinguished from the slow, consumptive, and cachectic febrile affections, which are followed by a general decline of the constitution, though there appears to be no organic injury, or local disorder, in any part of the system.

VII. *Eruptive fevers* are termed those, in which the skin or surface of the body discovers an eruption which consists either in vesicles, and pustules, such as the small-pox, scarlet fever, &c. or in spots somewhat elevated above the skin, and uneven to the touch, such as the measles; or in mere stains or spots, marked only by a discoloured surface; for example, in the petechial fever.

It would be superfluous to give farther explanations on the different kinds of fever, a subject which is but imperfectly understood in theory, though the generality of these maladies has, in consequence of many important discoveries in chemistry, been lately treated with greater success, than our medical predecessors were entitled to expect, from their deficient knowledge of natural philosophy. Thus, an attempt has been made to reduce *all fevers*, to *one* generic source, and to ascribe their origin to an undue proportion of *azote*, and a deficiency of *oxygen*, in the human system. Although we cannot approve of that uncommon fondness for *generalization*, which has been productive of incalculable mischief in medical practice, yet there appears to be some foundation for those eccentric opinions maintained by a foreign professor,

Dr. Reich, of Erlang, in a treatise "*On Fever*;" a translation of which has just been published in English. This ingenious practitioner has cured the most malignant putrid fevers, by the liberal use of mineral acids, and particularly the *muriatic*, or spirit of sea-salt. He acknowledges that acids have long been employed in fevers, though only in very small quantities, and chiefly as auxiliaries, especially the vitriolic, and those of the vegetable kind; but the muriatic acid has seldom been used. In the year 1773, indeed, Sir W. Fordyce highly recommended this acid to be given internally, in putrid and malignant fevers, and to be applied externally in the form of a liniment, or gargle, to the sloughs in the throat, frequently accompanying such fevers; but his liniment consisted only of twenty drops of the concentrated acid to one ounce of honey of roses; and his *antiseptic febrifuge* contained five drops of the acid mixed with two ounces of a strong decoction of Peruvian bark. In a subsequent pamphlet, concerning the virtues of the muriatic acid, which appeared in 1790, Sir William recommends it as the best remedy in all putrid diseases of the worst kind; in petechial, camp, and jail-distempers, as well as the malignant sore-throat, so frequently fatal in this country; and afterwards in the small-pox and plague. The original discovery of this invaluable medicine appears to belong to Constantine Rhodocanacides, who in 1664, published a treatise on the internal and external use of this acid, the extraordinary power of which he derived from the universality and approved value of common salt. Hence he recommended it to be mixed with food and drink, to the amount, if necessary, of 100 drops in 24 hours, both as a preventive and remedy for the plague, and as a general antiseptic.

Dr. Reich observes, that the quantity of acids necessary to effect a cure of fevers, depends on circumstances, and can only be determined by experience. It is, however, more advisable to begin with small doses, and to repeat them frequently; for instance, if a mixture be made of from one dram to half an ounce of the acid, eight ounces of water, and two of syrup, let the patient take a table-spoonful or more every hour, or two hours. But, in time of danger, from forty to an hundred drops, properly diluted, may be given at once, and such doses often repeated....As we propose to insert a few additional remarks on the use and efficacy of this acid, under the head of Typhus, we shall conclude with observing, that we have prescribed large doses of this powerful remedy only in two cases of complicated bilious and nervous fevers, in which it at first produced alarming symptoms, such as diarrhœa, vomiting, &c. though it was eventually attended with success. In short, it is one of those medicines which may be safely administered by the experienced hand of the practitioner, but which is apt to be misapplied by dabblers and empirics.

Fever *in horses*, a disorder to which these creatures are subject from various causes. The symptoms are: great restlessness; the animal's flanks beat; his eyes are red and inflamed; his breath is hot, and smells strong; his appetite is lost; he dungs little, but frequently; his urine is of a very

high colour, is discharged seldom, and with great difficulty; he appears to be thirsty, yet drinks little, though frequently; and his pulse is uncommonly high.

The first remedy to be applied is bleeding, when two or three quarts of blood may be taken from the animal, if it be large, strong, and in good condition. A pint of the following drink is then to be given four times in the course of the day: Take of baum, sage, and chamomile flowers, each a handful; of sliced liquorice-root half an ounce; nitre, 3 ounces: the whole is to be infused in 2 quarts of boiling water, and, as soon as it is cold, it is to be strained, the juice of two or three lemons squeezed in, and sweetened with honey; or, instead of the infusion above directed, an ounce of nitre, mixed with honey, may be given in the form of a ball, three times a day, and washed down with any small liquor.

The animal's diet ought to consist of scalded bran, allowed in small quantities; or, if he refuse this, a little dry bran sprinkled with water may be substituted. It will also be necessary to put some picked hay into the rack, as horses will frequently eat it, when they relish no other food: their water should be scarcely lukewarm, and given them frequently, but in small quantities. Their clothing ought to be moderate, for too much weight on a horse is highly improper in fevers.

If, in the course of two days after this treatment, the animal's appetite begin to return, and he eat a little bran or hay, careful nursing will be sufficient to complete the cure; but, if he continue to loathe his food, it will be necessary to take away more blood, and to repeat the drenches....The following clyster, consisting of two quarts of water gruel, fat-broth, pot-liquor, a handful of common salt, 4 ounces of treacle, and a pint of linseed-oil, should be administered every day, while his excrements continue dry or knotty. Such clysters are more proper than those consisting of marsh-mallows, chamomile flowers, fennel-seed, and other purging ingredients.

An opening drink prepared of 4 ounces of Glauber's salts, or cream of tartar, and an equal quantity of lenitive electuary, dissolved in barley water, or any other liquor, should likewise be given every second day, when the clysters may be omitted; the nitre balls, or the drink above mentioned, being continued every day as usual, unless the clysters be administered. In the course of four or five days, the horse will begin to pick his food, if he be not beyond the power of medicine; and, though his flanks will continue to heave for a fortnight, yet this may be effectually removed by walking him in the fresh air, and allowing him plenty of clean litter in the stable.

FEVERFEW, or *Matricaria*, L. a genus of plants consisting of six species, three of which are indigenous. The principal of these are:

1. The *parthenium*, or Common Feverfew, which grows in waste grounds, hedges, and walls, and flowers in June or July. This plant is refused by horses; the whole has a strong, disagreeable smell, a bitter taste, and yields an essential oil by distillation....It was formerly celebrated for its efficacy in hysteric, and other affections of the nerves; as well as for its tonic, stomachic, and resolvent proper-

ties. Dr. LEWIS, however, thinks it much inferior to chamomile, with which it agrees in all its sensible qualities, excepting that the common feverfew is much weaker. But its odour, taste, and other constituents, prove that it is a medicine of considerable activity....In Germany, it has been usefully employed in tanning and currying leather.

2. The *chamomilla*, or Chamomile Feverfew, which grows in corn-fields, dung-hills, as well as on road-sides, and is in flower from May to August. Its properties are similar to those of the common chamomile: it is eaten by cows, goats, and sheep, but not relished by horses; and hogs totally refuse it....According to PORNER, the flowers of this species of feverfew afford a fine yellow pigment, which may be rendered more permanent by the addition of alum, cream of tartar, and gypsum.... SCHEFFER, another German chemist, informs us, that a decoction of these flowers imparts a beautiful yellow colour to silk, if a solution of tin, saturated with cream of tartar, be gradually dropped into the liquor, till it acquires a deep yellow tinge. BERTHOLLET, however, on this occasion, remarks, that *pure* water must be employed, which does not precipitate the solution of tin, and that the *dyeing bath* should be kept in a hot, though not boiling state.

FEVER-POWDERS are generally understood to be those originally prepared by the late Dr. ROBERT JAMES, and by many still believed to be a certain remedy for fevers of every description. According to the recipe deposited in the records of Chancery (when Dr. JAMES took out a patent for the sale of his powders), they consist of *antimony* calcined with a continued protracted heat, in a flat, unglazed earthen vessel, adding to it from time to time a sufficient quantity of any animal oil and salt, well dephlegmated; then boiling it in melted nitre for a considerable time, and separating the powder from the nitre, by dissolving it in water....The chief intention in this process, is to divest the antimony of its sulphur, by mixing it with some animal substance, to prevent its running into glass during the calcination.

When this once celebrated empiric first administered those powders, he usually added a small proportion of the red precipitate of mercury to each dose; but he soon relinquished this practice, after observing that some patients were salivated by the use of his nostrum. Hence we find that he has conscientiously annexed the following clause at the end of his specification given into Chancery: "The dose of this medicine is *uncertain;* but, in general, thirty grains of the antimonial, and one grain of the mercurial, is a moderate dose." Signed and sworn to by ROBERT JAMES.

It is to be lamented that *regular* practitioners have sometimes deviated from the more rational path of medical science, and degraded themselves by following the numerous herd of quacks: nay, it is still more surprising, that even intelligent physicians have often humoured their prejudiced patients, by *prescribing* those fever powders, of which the inventor himself had but an indifferent opinion. For it is a well-attested fact, that the *Peruvian bark*, and not the antimonial powder, was the remedy to which

the late Dr. JAMES generally trusted in the cure of fevers. He gave his powders only to clear the stomach and bowels; after effecting that purpose, he poured in the bark as freely as the patient was able to swallow it; for he has repeatedly declared to Dr. MONRO, (see his *Medical and Pharmaceutical Chemistry*, vol. 1. p. 366, and foll.), that if there was a possibility of curing a fever, the bark was the remedy to be relied upon; and, if the disease did not yield to the latter, he was convinced that it could not be removed by any other medicine....However empirical this declaration must appear to every professional man possessing a moderate share of medical knowledge, yet it is amply sufficient to evince the fallacy of Dr. JAMES's Fever-powders, which, from the nature of their ingredients, are so violent in their operation, that we trust no prudent person will in future purchase, or use them, without submitting his case to the discretion of an *unbiassed* and competent judge.

FIELD, in agriculture, a piece of land inclosed, either for the purpose of tillage, or for pasture.

The best season for laying land down to grass, is the latter end of August, or the beginning of September, when the roots of the young plants will have time to strike deeply, before the frost sets in. Moist weather is the most proper for this purpose, as the earth will then be sufficiently warm, and the seeds quickly vegetate: but, if that season prove unfavourable, they may be sown in the middle of the month of March following.

In order to obtain a fine pasture, the soil should be thoroughly cleared from all noxious weeds, by repeated ploughing; for, if any of them are suffered to remain, they will speedily outgrow, and destroy the young grass. These weeds ought next to be raked up into heaps, burnt on the land, and their ashes spread as a manure; but, if the soil be clayey and wet, it will be necessary to make some drains to carry off the water; which, if suffered to stagnate, will both chill and sour the grass. Previously to sowing, the land ought to be laid as level and as fine as possible: thus, if the grass-seeds be clean, three bushels will be sufficient for an acre. After sowing, they should be gently harrowed, and smoothened over with a wooden roller.... When the grass comes up, all the vacant spots are to be provided with fresh seed; which, if it be properly rolled in, will in a short time attain the height of that first sown.

Few circumstances are of greater importance in rural economy, especially to graziers, than to ascertain the most valuable field for pasture. For this purpose, Mr. DAVID YOUNG ("*Agriculture, the primary Interest of Britain*," 8vo. 1788, 6s.) proposes to weigh all cattle previous to their going into each field, and to allow them neither food nor water for 12 hours before. After the whole pasture is consumed, they should stand for a similar length of time, without food and drink, and then again be weighed. Thus, the increase of weight in each animal, may be easily determined.

Fields ought not to be kept too long in pasture. When land is first laid down, with a view to ameliorate the soil, the common practice is to leave it in that state for many years: for it is the gene-

ral opinion, that the longer it is thus suffered to lie, the richer it will become for bearing corn. But, though the truth of this position be evident, the most important object of inquiry is, to ascertain the most beneficial *rotation of crops*.... (See CROP.)....The best criterion, perhaps, is to take up pasture for corn, as soon as the grass begins to be deficient both in quantity and quality; and, after a few crops, to lay it down again with grass-seeds: by this method the land may be kept in *good heart*, and considerable expence saved, while in the end, the soil will produce larger crops, and consequently afford greater profit.

FIG-TREE, or *Ficus*, L. a genus of plants, comprising forty-three species, of which one only is cultivated in this country, namely, the *carica*, or common fig-tree. It is propagated either by suckers arising from the roots; by layers; or by cuttings. The first are to be taken off as low down as possible; all ragged and superfluous parts being removed, and the tops left entire, especially if intended for standards. These are to be planted in nursery-rows, two or three inches apart; or, they may be set in the spot where they are intended to remain. They are then suffered to branch out and form a head, care being taken that the branches never be shortened; for, as the figs are always produced on the upper part of the young shoots, if these be be cut off, no fruit can be expected.

The best season for raising fig-trees by *layers*, is in autumn; the young pliable lower shoots are first to be selected from the moist fruitful branches, which are to be *laid* in the usual way; the body of the layers being covered with soil to the depth of three or four inches, and the top kept as upright and entire as possible. In the succeeding autumn, they will be fit to be separated from the parent-stock, when they may be planted either in the nursery, or in the place of their ultimate destination.

The time for propagating by *cuttings*, is either in autumn, or at any time during the month of March. The shoots to be selected for this purpose, ought to be those of the preceding summer; short, and strong; from 12 to 15 inches in length; and to have at least an inch of the two years wood at their base; the tops being left entire. These cuttings are to be set 6 or 8 inches deep, in a bed of good soil, in rows 2 feet apart: and, if they be planted in autumn, it will be requisite to protect the tops from the severity of the winter, with any kind of loose, long litter.

Fig-trees require a free exposure to the rays of the sun, at the side of an espalier: they ought to be frequently watered; and, according to BECHSTEIN, wood-ashes are for them a more proper manure than dung. Towards the winter of our colder climate, the root of the fig-tree ought to be somewhat loosened, and the trunk bent down in the form of a bow, and covered with straw to protect it from the severity of the frost.

There is a mode of increasing and ripening the fruit of the domestic fig-tree, by means of insects: it is practised in the Levant, and known by the name of *caprification*. The principal of those insects appears to be the *cynips psenes* that deposits its eggs in the figs; from these arise small worms which, when covered with the *pollen* or flower-dust, migrate from

the male flowers, take shelter in the female ones, and thus effect fructification. In consequence of this natural process, the figs not only ripen more speedily, but also become much larger : so that a fig-tree which formerly produced about 25lb. of ripe fruit, now yields nearly 300lb.....Later experience has proved that *caprification* may be successfully imitated in gardens, by wounding the buds of the figs with a straw or feather dipped in sweet oil....BECHSTEIN advises a drop of olive oil to be introduced into the calyx of the figs when half ripe, and to repeat this unction every four or five days : as it will remarkably promote the growth and maturing of the fruit. Plums and pears also, when wounded by insects, have been observed to ripen at a more early period, and the pulp about the wounded part to acquire a more delicious flavour.

The principal varieties of the common fig are, the brown, or chesnut coloured Ischia fig, the murrey, or brown Naples fig ; the common blue or purple fig ; and lastly, the Turkey fig, which is in the greatest estimation, and is imported in considerable quantities into this country.

Figs contain a large portion of mucilage, and a small quantity of oil. They are grateful to the stomach, and more easy of digestion than any other sweet fruit ; they abound with saccharine matter, and are very nutritious, though they are apt to occasion flatulency, when eaten without bread or other mealy substances....A decoction of figs affords excellent gargles to cleanse the throat and mouth : this fruit also forms an ingredient in lenitive electuaries, and pectoral draughts ; it is likewise applied externally to soften, digest, and promote maturation. When in an unripe state, figs, as well as the whole tree, yield an acrid milky liquor, which, if taken as a medicine, proves both purgative and emetic ; but externally affords a mild caustic : hence it is frequently employed for the removal of warts. This juice has also been substituted for *sympathetic ink* ; as the characters written with it, do not appear visible till they are exposed to a fire.

In dyeing, a decoction of the green branches and leaves of the fig-tree imparts, according to SUCKOW and DAMBOURNEY, a deep gold colour, of a brown-reddish shade. The latter observes, that the young branches communicated a delicate brown to cloth prepared with a solution of bismuth ; but the leaves alone yielded a very deep yellow colour. It is remarkable, that the substances dyed with any part of the fig-tree, retained a very agreeable fragrance, resembling that of the tuberos, even after being washed and kept for five months. Hence they might be usefully employed as ingredients in other dyeing drugs, which possess a less agreeable, and sometimes offensive, smell....The wood of the fig-tree is almost indestructible, and was formerly much employed in the East, for the preservation of embalmed bodies.

[Figs ripen very well by the middle of September, in Philadelphia, when enjoying a free exposure to the sun. In the southern states they flourish luxuriantly,and might become an article of extensive export and home consumption, if pains were taken to introduce the large Levant fig.]

FIGWORT, or *Scrophularia*, L.

a genus of plants consisting of twenty-one species, four of which are natives of Britain : the principal of these is the *nodosa*, or great figwort, which is perennial, grows in woods and moist hedges, and flowers in the month of July. It is eaten by goats, but refused by horses, cows, sheep, and swine.... The animals last mentioned, when diseased with the scab, may be cured by washing them in a decoction of these leaves. BECHSTEIN remarks, that the fibrous root, when overgrown with small knobs, is said to afford a good remedy for the worms in hogs.

FILBERDS. See HAZLENUT-TREE.

FILE, a tool employed by smiths and others, for the purpose of smoothing, polishing, or cutting metals.

This instrument is composed either of iron or forged steel, cut by means of a chisel and mallet, in small furrows of various depths, and in different directions, according to the grain or touch required. After being thus cut, it is tempered with a very hard and dry soot, which is diluted and worked up with urine, vinegar, and salt, to the consistence of mustard. The process of tempering consists in rubbing the files over with this preparation, covering them with loam, and then placing them in a charcoal fire, whence they are removed as soon as they become red-hot. Immediately after being taken out, they are immersed into cold spring water ; and, when cold, cleaned with charcoal and a rag ; after which operation, they are laid up in bran to prevent them from becoming rusty.

Files are of different forms, sizes, cuts, and degrees of fineness, in proportion to the various uses and occasions for which they are designed ; such are the common square, flat, triangular, or round files ; the *rough-toothed* files, which are intended to cut more speedily than any other ; and the *fine-toothed* file, which cuts more slowly, and is appropriated to finer workmanship....The best snd most durable instruments of this description are manufactured at Sheffield.

FILM, in farriery, is a thick pellicle or skin, that is formed on the eyes of horses ; in consequence of which their sight is impaired.

In order to disperse the film, it has been recommended to reduce common salt and sugar of lead, to a fine powder, and put a little into the eye, so as to corrode the film. Another remedy consists in applying a small quantity of finely pulverized sal ammoniac daily to the part affected, till the obstruction be removed.

FILTRATION, in chemistry, as well as in domestic economy, is the process of straining or filtering liquors by means of woollen cloth, cotton, linen, paper, or other materials....It deserves to be previously remarked, that in every attempt at purifying fluids in the manner here alluded to, we can divest them only of those foreign ingredients which are *mixed* with them, and not of such as they hold in *solution*. The former may be separated from them, by proper filtration ; but the latter must be disengaged, either by precipitation or distillation. Although the utility of filtration is thus limited to the noxious particles *mixed* with liquid bodies, such as foul water, yet it is sufficiently important to deserve some attention.

The common filters are of two

sorts; namely, simple pieces of paper, or cloth through which the fluid is passed; or similar materials twisted up in the same manner as skeins or wicks; they are first wetted, then squeezed, and one end put into the vessel, which contains the liquor to be filtrated; the other end is to be suspended beneath the surface of the liquor, the purest parts of which drop gradually out of the vessel, leaving behind the coarser particles.

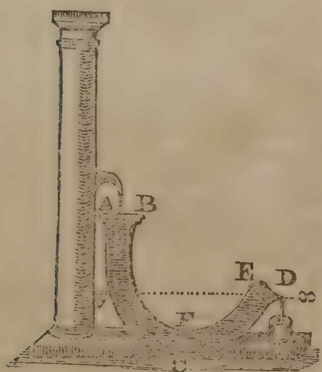
These filters, however, are not calculated for domestic use: hence different machines have been invented for the purpose of purifying turbid water. But among these various contrivances, few appear to possess the advantage of simplicity, combined with that of affording an ample supply of a fluid so essentially necessary to the preservation of health....A patent has lately been granted to Mr. JAMES PEACOCK, of Finsbury-square, for a filtering machine, which is stated to be superior to any hitherto invented. It completely accomplishes the purpose of filtration, by causing the turbid fluid to ascend through a medium of fine gravel, of progressive degrees of fineness, by which means the foulest water or other fluid becomes perfectly freed from all (mixed) impurities, without any noxious mineral quality, which pumice or other common filtering stones are suspected to communicate. Should, from continual use, its operation become in any degree impeded, it may be completely cleansed with the greatest facility in the short space of one minute; an advantage possessed by none of the common machines that operate by *descent*. Beside these useful properties, Mr. PEACOCK's filtering machine does not occupy more room than a large drip-stone with its apparatus, and yields a constant and pure stream of more than 300 gallons in 24 hours....A specimen of this machine is deposited for inspection at Guildhall, London.

As we are, from a principle of justice to the public, no advocates for *patent inventions*, that upon the whole arise from the same mercenary and contracted source as *patent quack medicines*: we shall recommend a very simple and effectual apparatus, by which the purest water may be easily procured. This contrivance is calculated on the plan of the celebrated filtering machine erected at Paris, in the vicinity of the *Samarataine*, and by means of which the foul water of the river Seine is so completely purified, as to be divested of its laxative properties. Besides, this machinery, if constructed on a large scale, is well adapted to supply the largest breweries, or dyeing works, with any quantity of *pure* water at a trifling expence, and is attended with very little additional trouble.

When we reflect on the method which Nature pursues in the filtration of water, we find that such waters as descend from hills, tho' passing through sand and rocks, are seldom perfectly pure; but that those are the most limpid, which by ascending, ooze out near the foot of a mountain. The cause of this difference appears to be owing to the circumstance, that if the water only *descends* through sand, the finest and most weighty foreign particles gradually penetrate through the sandy strata; on the contrary, when it is forced to *rise* through sand, all such ponderous ingredients settle at the bottom; because, from their greater speci-

fic gravity, they cannot ascend to the top. The lighter particles of fluids, consequently, in both cases remain in the upper strata of the earth or sand.

From these considerations, Professor PARROT, jun. of Paris, was induced to give his filtering machine the form represented in the following cut:



The principal part of the machinery consists of a square vessel, bent in the form of an inverted syphon. The curve may be circular, eliptic, or in any other direction. This vessel is filled with fine, pure sand, till nearly the height of the dotted line x, y, which denotes the ascent of the water to D, whence it flows into the receiver. The part marked A, B, should always project above this line, according to the size of the filtering machine. To A, B, there is attached a woollen bag, which is open at the top, and the lower part of which touches the sand. It serves the purpose of collecting the coarsest impurities, and thus preserves the sand for a longer time from becoming foul. The bag, therefore, may occasionally be removed, and rinsed in clean water....It is evident, that the water flows at A, through the bag into the filtre, and rises at the place marked D, which is considerably lower than the former. It affords a very agreeable sight to observe the most limpid fluid penetrating the uppermost stratum of sand, perfectly similar to that oozing from the purest natural spring.

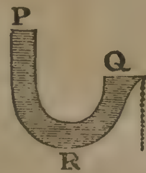
Prof. PARROT remarks, that he procured a filtering machine made of block-tin, for ascertaining by experiments the purity and quality of water, that may thus be obtained in a given time. It consisted of the following dimensions: the small diameter B, E, was eight Paris inches; the large of the whole machine, eleven inches; consequently the thickness of the vessel A, B, was one inch and a half; the breadth of it, two inches and seven-eighths. The perpendicular height of the lower side, from C, its basis, to the rim D, whence the water issues, was four inches and one-twelfth; the opposite height of the mouth A, B, eight inches and three-fourths; and the height of the sand on the side marked D, was three inches and one sixth.

Although, in experiments of this nature, much depends on the relative size and purity of the sand, which necessarily afford different results, yet Prof. PARROT has, after repeated trials, deduced the following conclusions, which appear to be well-founded.

1. That the difference of the *niveau*, or water-level, has an essential influence on the quantity of the purified water thus obtained. 2. That a prolongation of the stratum of sand does not considerably diminish the product of the filtre,

but remarkably contributes to the purity of the fluid. 3. That if the water be forced to pass through the sand with increased velocity, it will be less pure than by allowing it a proper time for its passage; and, 4. That a machine of the dimensions above described, will furnish about three quarts of water in an hour, or eighteen gallons in twenty-four hours. This quantity, however, being too large in proportion to the size of the machine, it is advisable, either to lessen the difference of the water-fall; or, which is still better, to prolong the stratum of sand, in order to reduce the filtration of the water to half the quantity above stated, and to obtain it in greater purity. Thus, a filtering apparatus, eighteen inches long from A to D, two inches thick, and four broad, would afford every hour six pints of very pure water. If, therefore, so small a machine, containing a very moderate stratum of sand, and requiring only a difference of two or three inches in the height of the water, furnishes a clear and pure fluid, it follows, that an apparatus on a larger scale, provided with a bed of sand from five to six feet long, and admitting of a difference from twelve to eighteen inches in the fall of the water, might be usefully employed in public wells, hydraulic machines, and even in camps, for the supply of an army.

In the construction of large filtering machines, Prof. PARROT justly observes, that they should not be extended in the direction A, C, D, to a greater length than is absolutely necessary; as, in this case, they will not require any considerable difference in the fall and rise of the water: on the other hand, their breadth and thickness may be accordingly increased.... Thus, the diameter of such a machine would still more resemble that of a syphon, as is represented in the annexed cut.



This form might be also adopted for smaller machines, especially such as are designed for *travellers*, two of whom might be amply provided with pure water, and in a very short time, by a vessel of the following dimensions: from P, to Q, eight inches long; from P, to R, twelve inches high; and the whole four inches in breadth.

If the form last delineated be employed on an extensive scale, there should be a trap door in the lowermost part marked R, so constructed, that it may fit exactly, and admit no passage to the water: this aperture would serve only for the removal of the sand, when it is rendered foul by long use. In the smaller machines, intended for travelling, such a door is unnecessary, as they may be easily emptied of their contents through either of the orifices P, or Q. Instead of this addition to the latter, the upper room (which in the first of these cuts is circumscribed with the letters B, F, E), might serve as a reservoir of pure water, that could either be decanted, or drawn off by means of a cock applied to the centre of the machine, marked F. We think, however, this latter arrangement, which is proposed

by M. Parrot, in many respects objectionable, and therefore advise the reader to make use of the more simplified construction. Hence we shall only add, that every filtering machine ought to be provided with a cloth cover, to prevent the dust from rising with the water, without impeding its filtration.

It is needless to expatiate on the great advantages of filtering machines in the different processes of dyeing, baking, brewing, distilling, and all the domestic arts. As no particle of real nutriment can be assimilated to the human fluids, without being previously macerated and reduced by *water* (whether this fluid be introduced into the stomach, in the form of beer, wine, spirits, tea, &c.) it will be easily understood that *impure* water cannot fail to produce, however slowly, many dangerous, and often incurable diseases....the source of which is seldom suspected...See Water.

[A filtering machine was invented a few years since in Paris, by Mr. Smith, which purified a great quantity of water: it would contain about eight gallons of water, and being wickered, was rendered very portable: the whole machine not taking up more space than half a barrel. It is understood, that the process consists of passing the water, first through spunge, and then through alternate layers of chalk, sand, and charcoal.

The editor was present at an experiment last year with the machine, which was highly satisfactory. Water was taken from the gutter in the street, and drank perfectly pure, in twenty minutes after having passed through the machine. These experiments were repeated at the editor's house, in the presence of Dr. Joseph Priestley, last spring; and demonstrate the great utility of the machine.

Mr. Raphael Peale, of Philadelphia, some months since, made the following experiments before the *Amer. Phil. Soc.* and afterwards at the coffee-house, before a number of mercantile gentlemen, which shew a cheap and easy mode of filtering water by means of the above agents...." He used 3 eight-penny flower pots; one of which was half full of charcoal, and the hole in the bottom loosely closed with a piece of spunge, to prevent the coal from passing through; the second half filled with fine river, pit, or beach sand, its hole likewise stopped with spunge; the third was empty, with the hole in the bottom tightly corked; the one containing sand was placed in that which held the powdered moistened charcoal; and the empty one within that which held the sand; one end of a long spunge was fastened to the inside bottom of the upper empty vessel, by means of a stick, crossing from side to side, the other end hanging below its outside, bottom; the upper pot being filled with the bad water, and the spunge wetted, acted as a drawing syphon carrying the water thro' the spunge into the sand, leaving the grosser filth behind; then through the sand, which deprived it of the remaining colouring matter; and lastly, the charcoal completed the defecation: the waters used were of three kinds: first, from a stagnant pond, of a bright green colour, and offensive smell; the second was putridity itself, a mass of watery matter from the macerating tub of an anatomical theatre; and lastly, dish-water".....Most of the gentlemen present drank of these waters after passing through the pots."

The editor was present, at the above experiments at the coffee-house, and tasted the water perfectly pure, after having passed the filtre.

"On board of a ship, a barrel, keg, or bucket may be used, by boring a hole in its bottom, and instead of spunge, a piece of loose oakum may prevent the coal from escaping with the water; one third of the vessel is then to be charged with powdered charcoal, or common coals extinguished by water; another third with sand, or, if not to be had, pounded crockery, or bricks from the camboose; the upper space left for the water desired to be purified; the water, though ever so obnoxious, will pass thro', cleared from all foreign matter, as sweet and pellucid, as the finest pump-water."

The reader may expect some additional observations on the *means of preserving water* at sea, under the article WATER.]

FINCH, or *Fringilla*, L. a genus of birds, comprising one hundred and eight species, of which ten only are natives of this country; the principal of these are mentioned in their alphabetical order.....See CANARY BIRD, GOLD-FINCH, LINNET, SPARROW, &c.

FINING: See CLARIFICATION.

FIR-TREE, the name of several species of the *Pinus*, or pine-tree, of which the following are the principal:

1. The *sylvestris*, or Scotch fir, which is a native of Scotland, and flourishes best, in a poor sandy soil, especially, if it be mixed with loam: on rocks or bogs, it seldom attains a large size; if planted in a black soil, it becomes diseased; and, on chalk-lands, it perishes.

This species of fir thrives most luxuriantly on the north and east sides of hills, where it not only grows more rapidly, and attains a greater height, but the grain of its wood is also more compact, and the trees are fuller of sap than if they had been planted in another direction.

The Scotch fir is propagated from seeds, which are obtained from the cones or fruit it produces. The proper time of sowing, is in the latter end of March, or beginning of April: if the seeds be set in a grove, the tree becomes tall and naked; if in open situations, exposed to the sun, it becomes branched. At the age of four years, it is to be transplanted to the place where it is intended to remain; during which operation the utmost caution should be taken, that the central or tap-root be not broken off, or in any manner impeded in its growth; as, in that case, the stem would cease to shoot upwards, and the tree remain a dwarf. But, notwithstanding every care taken by the industrious planter, his hopes are often frustrated by predatory animals, such as squirrels, that strip the whole bark off the young tree, in consequence of which it dies, and is broken by the first high wind. The hare is another enemy to young firs, though less dangerous: it is affirmed that hares may be drawn away from them, by sowing in their vicinity the *Cytisus Laburnum*, a species of the Bane-trefoil, the young shoots of which they prefer to firs.

This species of the fir, is one of the most useful plants in the whole vegetable creation: it furnishes us with the best red or yellow deal, which is employed in the making of masts, floors, wainscots, tables, boxes, and for numberless other purposes. The trunk and branch of this species, in common with the

rest of the pine-tribe, afford excellent pitch and tar....The tops, or young tender shoots, are an useful substitute for fodder, especially during the winter season: see vol. i. The roots, when divided into small splinters, are employed by the poor as a substitute for candles....The outer bark is of considerable use in tanning leather; the inner rind is, by the inhabitants of Loch-Broom, in the county of Ross, converted into ropes. In the more northern parts of Europe, it is, in times of scarcity, made into bread: for this purpose, the inhabitants select a tree, the trunk of which is smooth, and contains the least portion of resin: they strip off the bark in the spring, dry it gently, then reduce it to powder, and knead it with a small quantity of corn-meal and water, in which state it is baked into bread....The young cones, when distilled, afford an essential diuretic oil, somewhat resembling that of turpentine: a resinous extract is likewise prepared from them, and believed to possess virtues similar to those of the balsam of Peru. An infusion of the buds is highly recommended as an antiscorbutic.

[An experiment is now making with the *fir*, as a hedge, by Mr. Coxe, near York-Town, in Pennsylvania, whose experience of the tree in Europe, has induced him to import them, and attempt their propagation.]

2. The *Abies*, or Spruce-fir, which is a native of the northern parts of Europe, whence it has been introduced into this country. It is propagated in the same manner as the Scotch-fir, and delights in a dry, gravelly situation, though it will thrive in almost every soil. It also succeeds on a loam, and even on a hard, dry rock; but frequently decays at the end of 18 or 20 years, if planted on a stiff, wet clay. The same precautions as are to be observed in transplanting the Scotch-fir, ought to be more carefully attended to with respect to the Spruce-fir, which should be set exactly in the same direction in which it stood before; as, by turning the bark to another quarter of the compass, the tree generally perishes.

There are two varieties of this species, namely, the white and black spruce; the wood of both is very light, and decays when exposed to the air for a considerable length of time: it is chiefly employed for packing-cases, musical instruments, and the like. Its branches form the principal ingredient in preparing the essence of spruce, from which spruce beer is brewed. A fine clear *turpentine* oozes from these trees: the Indians of North-America are said to employ it in curing green wounds, as well as certain internal disorders: the resin which distils from the White Spruce-fir, in particular, is supposed to be a sovereign remedy in fevers, and in pains of the breast and stomach. In Britain, this resinous juice is boiled in water, and strained through a linen cloth, by which process, it acquires a solid consistence, a reddish brown colour, and an odour by no means disagreeable; whence it is called *Burgundy pitch*. In obstinate coughs, affections of the lungs, and other internal complaints, plasters of this resin, by acting as a topical stimulus, are frequently found of considerable service.

3. The *picea*, or Yew-leaved Fir; which is a tall ever-green, and a native of Scotland, Sweden,

and Germany. This species also produces two varieties, viz. the *Silver Fir*, and the *Balm of Gilead Fir*. The former grows to a great height (in Germany sometimes rising to 180 feet), and has received that name from the white appearance of its leaves. It is very hardy, and will thrive in any situation; but prospers remarkably in a rich, loamy soil. The balm of Gilead fir is eminently calculated for ornamental gardening, on account of the beauty of its form, and the fragrance of its foliage.... It ought to be planted in a rich, good earth, as it grows best in a deep, black, sandy mould, where its roots have sufficient room to strike freely. From this variety exudes the resinous juice, erroneously called *Balm of Gilead*, on account of its possessing the same properties as that which is produced from the *Pinus balsamea*, or Hemlock-fir, a native of Virginia and Canada, but seldom cultivated in England. In common with the other turpentines obtained from the pine tribe, that of the balm of Gilead fir is a hot, stimulating, and detergent medicine: small doses of it have sometimes been successfully used in chronic rheumatisms and palsy.

The different species of fir are infested by a variety of insects: the most formidable of these, is a brown grub, about $\frac{4}{10}$ of an inch in length, which changes into a brownish moth, resembling those producing the grubs which infest apple and pear-trees. These moths deposit their eggs in the heads or tops of the firs, where they are hatched in the month of May, when the young grubs eat their way into the leading branches, and consume the pith in their course. They continue their depredations till the beginning of June, when they assume the form of chrysalis, and lie in a torpid state till mid-summer, at which period they become perfect moths. As these insects multiply most rapidly, the greatest caution is necessary in planting firs, that they may not be propagated from an infected nursery; in which case, it will be extremely difficult to extirpate the vermin. The only effectual method of destroying them is, to lop off, in the month of May, the branches thus infested; for, after the trees have attained a height exceeding ten or fifteen feet, there is no remedy.

END OF VOLUME SECOND.

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